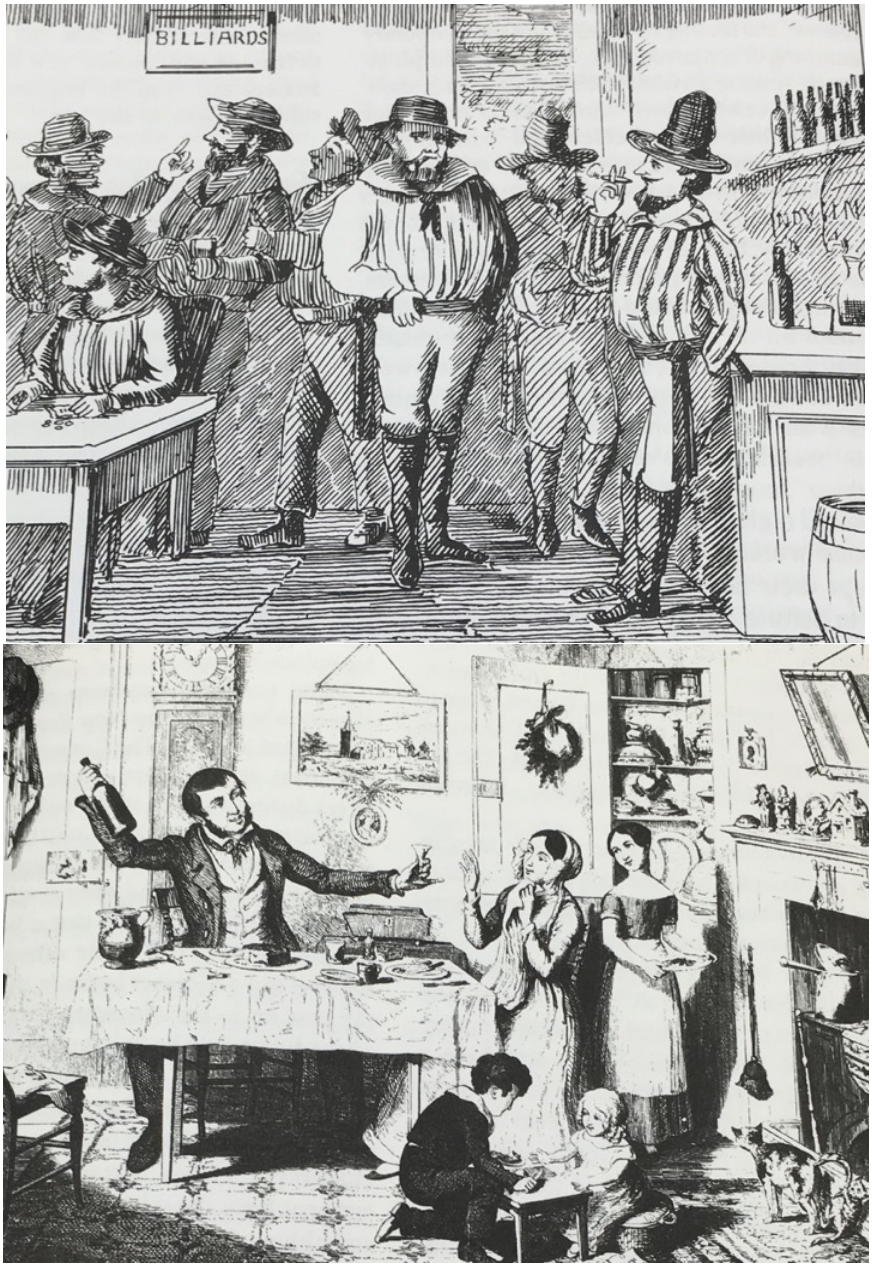
It's Your Shout!
A New Way of Measuring Use wear on Glass Bottles

By Maeve Platts



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Abstract

It was not until 1922 that glass manufacturing was available in New Zealand and prior to this, glass bottles were considered valuable and useful objects. This lack of glass encouraged reuse. Reuse has implications for consumption analyses and the interpretation of bottle glass assemblages but to date there has been no systematic method of documenting this. The following research examines if it is possible to quantify evidence of wear on glass bottles in a way that can be applied to archaeological specimens.

With the presumption that continued use of a bottle will leave physical evidence, a scale was produced for measuring the use wear on glass bottles. The scale was then employed on five different sites located in Christchurch. These sites consisted of a warehouse/brewery, a pub/inn, a bottle exchange and two domestic sites. The aim was to discover if it was possible to measure use wear on glass bottles and to see if there was any variation in the extent of use wear and, therefore reuse, within these sites and among different bottle types. This enabled the results to be used to contribute to a broader interpretation of the social life of Victorian Christchurch with an emphasis on the drinking culture of the time.

Title Page Images: Top- Alcohol in the Home (Eldred-Grigg 1984 pp. 71).
Below- Social Drug. Drinking in Public (Eldred-Grigg 1984 pp. 64)

Acknowledgments

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Chapter 1: Introduction

1.1: Introduction

During the 1800s, many families moved to New Zealand from the United Kingdom in the hope of a new and prosperous life. After the industrial and agricultural revolutions, the population in the United Kingdom had increased from 16 million in 1801 to 26 million in 1841 and the living conditions were cramped and unhealthy (Simpson 1997). Although some did not like New Zealand's association with the convict settlements of Australia, others were in favour of immigration to New Zealand and the renowned New Zealand Company was formed in 1839 (previously known as the New Zealand Association that had been formed in 1837). The New Zealand Company along with Edward Gibbon Wakefield promoted immigration to New Zealand and persuaded many people with the promise of 100 acres (40.5 hectares) of farmland and one acre (0.4 hectare) of town land. The New Zealand Company was responsible for most of the major planned settlements in New Zealand and by 1852 there were 28,000 immigrants in New Zealand compared to 2,000 in 1839 (Simpson 1997).

However, some issues arose with limited supplies of artefacts such as ceramics, metal objects and in particular, glass bottles. Glass manufacturing only became available locally after the 1920s and therefore the immigrants had to import all bottles from America, Australia or the United Kingdom (Petchery & Innanchai 2012). This rendered them expensive but invaluable commodities (Lawrence & Davies 2010) and led to the reusing and recycling of glass bottles. Reuse affects our understanding of bottles and needs to be taken into account when collections of artefacts are analysed and interpreted. Unfortunately, bottle reuse is not currently fully understood (Woff 2014) and the need for more research in the field has inspired this study.

This thesis examines the possibility of creating a systematic way to measure the use wear on glass bottles in order to measure the extent of reuse. Reuse has implications for the interpretation of bottle glass assemblages, but to date, there has

been no systematic way of documenting it and determining whether there is variation in reuse between different bottle types and between assemblages from different sites. A scale for measuring the extent of use wear on a variety of different bottle types has been developed and has been built on the presumption that continued use of a bottle will leave physical evidence in the form of scratches, pitting and wear, especially on its base. The scale was first tested on a 19th century bottle exchange assemblage that was located in Christchurch (15 Lawson Street) and, due to the success, it was used on the following four different environment/sites for comparison:

A warehouse/brewery on the corner of 84 Hereford Street and 130-136 Oxford Terrace a pub/inn located at 794 Colombo Street and two domestic contexts (272-276 Worcester Street and 16 Cotterill Street).

All of these sites are situated in Christchurch (Figure 1) and their assemblages will help to determine not only if it is possible to measure use wear on glass bottles but they will also contribute to a wider study on the social life of Victorian Christchurch and especially the drinking culture at that time. Alcohol was an important part of the daily life in Christchurch, especially in the Victorian era. By 1878, there were forty-one hotels and six breweries in Christchurch alone (Rice 2008). Therefore, there will be particular interest in the drinking culture in Victoria Christchurch within this thesis.

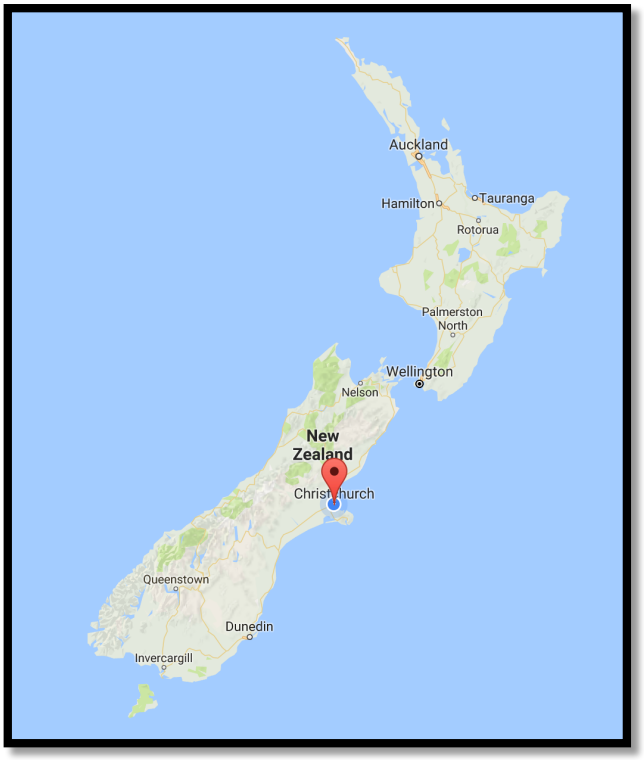


Figure 1: Map of Christchurch. (2017 Google Maps)

This chapter will firstly clearly state the research questions of this thesis. The second part of the chapter will briefly discuss bottle reuse where it will define what bottle reuse is as well as its associated problems within archaeology, such as dating. It will also outline the bottle reuse cycle. The third and last part of the chapter will summarise the thesis outline.

1.2: Research Questions

1. Is it possible to quantify evidence of wear on glass bottles in a way that can be applied consistently to archaeological specimens?
2. What were the most common bottle types and alcohol bottle types in each context?
3. What bottle types were reused most frequently based on the amount of use wear? What are the reasons for this?
4. What alcohol bottle types were reused the most? What are the reasons for this?
5. What context had the most extensive wear? What are the reasons for this?

6. Can these results tell us anything about the Glass Vessel Use-Reuse Cycle in Victorian Christchurch?
7. Can these results tell us anything about the social life of Victorian Christchurch, especially its drinking culture?

1.3: Bottle Reuse

1.3.1: What is Bottle Reuse?

Bottle reuse played a significant role in life in colonial New Zealand ensuring that valuables were used to their full potential. Bottle reuse differs from the current recycling practices whereby glass is melted down to become new objects. In the past the physical bottle was simply washed and reused in its original form (Argus 1880; Caple 2006; Woff 2014). Reuse is the use of an object in its original form without modification (Caple 2006; Gamble 2015; Skibo & Schiffer 2008; Steinberg 2008; Woff 2014; Ellis & Woff 2017). Throughout their use-life, bottles could be reused multiple times. According to Woff (2014), bottles were reused on average 30 times before being discarded. The Comptroller Federal of the U.S and the Organisation for Economic Cooperation and Development state that up until the 1940s beer bottles in America averaged 32 reuses and soda pop bottles 24 reuses before being discarded, (Busch 1987).

In the 1800s, bottles could have held many different products throughout their use-life and did not have to be modified to do so (Davies 2002; Gamble 2015; Woff 2014). When a bottle is reused, the primary function of the bottle does not change but the product or substance that is held in the bottle, sometimes does (Caple 2006; Woff 2014). It is hard to discern if there has been a change in product by simply looking at the bottle itself (Gamble 2015; Lawrence 2000; Woff 2014) and this difficulty of determining function change and reuse and other problems are points that will be discussed in the next section.

1.3.2: Problems with Bottle Reuse in Archaeology

One of the main issues with bottle reuse is there is currently not enough information relating to bottle reuse and this has potential implications for how archaeological bottles are analysed and interpreted. Bottles are generally catalogued using their intended function, based on the bottle form (Busch 1987; Lawrence 2006) and not the product the bottle last contained (Woff 2014). According to Lawrence (2000) and Woff (2014), an artefact's intended function is not essentially the only function of the object – it is simply the easiest to distinguish. Unfortunately, using the intended function of an artefact as the benchmark by which cataloguing, and therefore analysis and site interpretation, is carried out can lead to misinterpretations. The problem has been noted in some archaeological studies but only a few address it in detail. This thesis aims to determine exactly what bottle types were reused often as well as to create a way to be certain if a bottle was reused or not. This will hopefully provide more accurate bottle and consumption analyses and site interpretations in the future.

Another problem regarding bottle reuse in archaeology is dating. The time-lag of glass bottles, which is the difference between the date of manufacture and the date of deposition, is usually the problem. The date of manufacture is easier to distinguish than the date of deposition due to embossing and manufacturing techniques (Adams 2003). However, due to the long use-life of a reused bottle, it is difficult to pinpoint a deposition date. Reused bottles were usually used, washed, refilled, possibly stored for a period of time and then emptied again (Adams 2003). This process may have been repeated for decades before the bottle broke or was discarded. Bottles must be used very cautiously when dating a site and it cannot be assumed that all bottles were reused, for example, a bottle could break before being used/filled (Adams 2003). The use wear scale will determine if bottles were reused and subsequently could become an important tool for archaeologists.

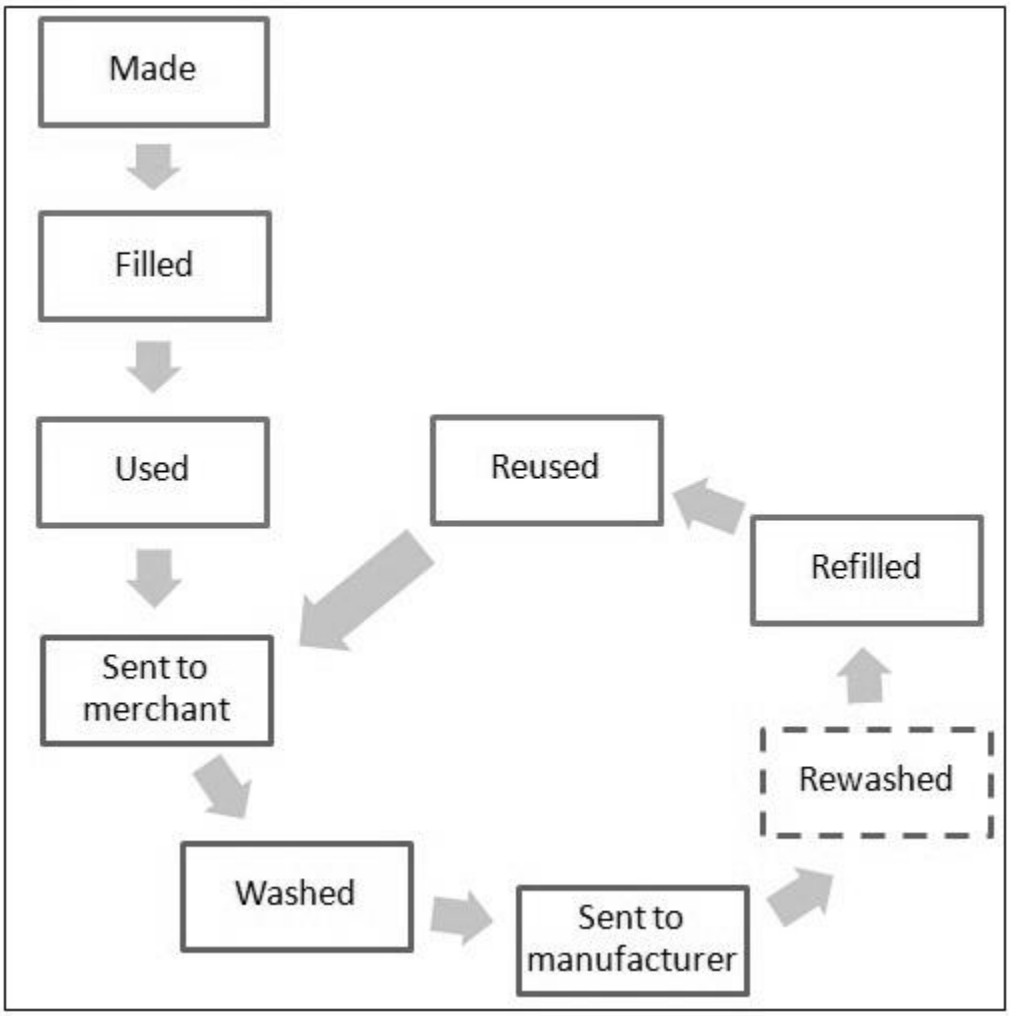
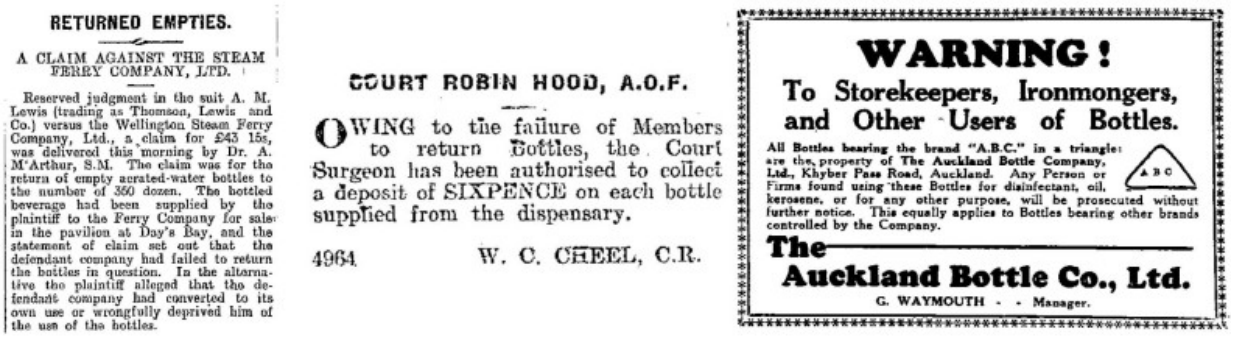


Figure 2: A Simple Reuse Cycle (Woff 2014 pp. 15).

1.3.3: Bottle Reuse Cycle

As shown in Figure 2, bottles were firstly manufactured, then filled and sold. After using or consuming a product stored in a bottle, options for customers were numerous. They could simply discard the bottle into a backyard dump or onto the street. However, it was rare for the majority of Christchurch homes and businesses to throw away whole, usable bottles as people recognised their value. Bottles were prized because not only did they require a highly skilled workforce to produce but they also needed to be imported from other countries and this rendered them expensive and in short supply (Busch 1987; Lucas 2002; Woff 2014). Because of the loss encountered by manufacturers of the product, a price was put on bottles to ensure their safe return. Newspapers from the pre-1920s were filled with

advertisements from hotels, soda water manufacturers and pharmacists offering discounts or cash for the return of their bottles. Court action was sometimes brought against people or companies who failed to return bottles and they were consequently convicted and fined for the offence (Garland 2013; Figures 3 & 4). However, many people did return bottles to shops in order to be reimbursed for the cost (Busch 1987). Due to their high cost, bottles would be reused by brewers and bottlers indefinitely only to be thrown out by these businesses when they were broken and unfillable (Carney 1998). These bottles would have carried many different products throughout their use life (Woff 2014; Ellis & Woff 2017).



RETURNED EMPTIES.

A CLAIM AGAINST THE STEAM FERRY COMPANY, LTD.

Reserved judgment in the suit A. M. Lewis (trading as Thomson, Lewis and Co.) versus the Wellington Steam Ferry Company, Ltd., a claim for £43 15s, was delivered this morning by Dr. A. M'Arthur, S.M. The claim was for the return of empty aerated-water bottles to the number of 360 dozen. The bottled beverage had been supplied by the plaintiff to the Ferry Company for sale in the pavilion at Day's Bay, and the statement of claim set out that the defendant company had failed to return the bottles in question. In the alternative the plaintiff alleged that the defendant company had converted to its own use or wrongfully deprived him of the use of the bottles.

COURT ROBIN HOOD, A.O.F.

OWING to the failure of Members to return Bottles, the Court Surgeon has been authorised to collect a deposit of SIXPENCE on each bottle supplied from the dispensary.

4964 W. C. CHEEL, C.R.

WARNING!

To Storekeepers, Ironmongers, and Other Users of Bottles.

All Bottles bearing the brand "A.B.C." in a triangle are the property of The Auckland Bottle Company, Ltd., Khyber Pass Road, Auckland. Any Person or Firms found using these Bottles for disinfectant, oil, kerosene, or for any other purpose, will be prosecuted without further notice. This equally applies to Bottles bearing other brands controlled by the Company.

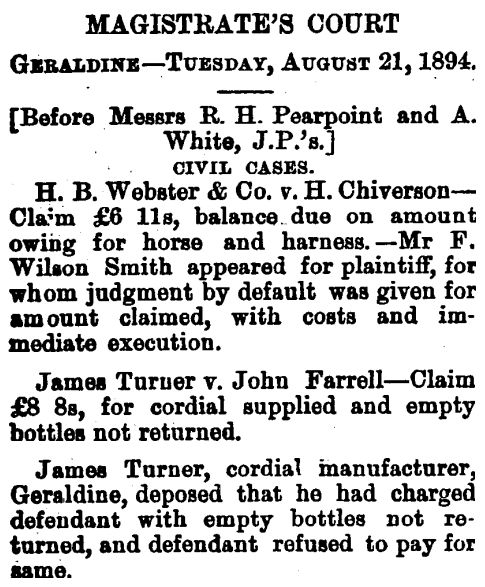
A B C

The Auckland Bottle Co., Ltd.

G. WAYMOUTH - - Manager.

Figure 3: New Zealand Newspaper Notices and Advertisements on the Issue of Bottle Return and Reuse. (Evening Post 10/09/1909; Colonist 13/09/1919; Auckland Star 19/11/1926)

There were various ways that a bottle could get from the customer to the bottle merchant or the product's factory. Bottles could be returned to a shop, directly to a merchant or directly to a factory. Upon reaching a merchant, the bottle would be washed and passed on to a factory where it may or may not have been washed again (Woff 2014; Ellis & Woff 2017).



MAGISTRATE'S COURT

GERALDINE—TUESDAY, AUGUST 21, 1894.

[Before Messrs R. H. Pearpoint and A. White, J.P.'s.]

CIVIL CASES.

H. B. Webster & Co. v. H. Chiverson—Claim £6 11s, balance due on amount owing for horse and harness.—Mr F. Wilson Smith appeared for plaintiff, for whom judgment by default was given for amount claimed, with costs and immediate execution.

James Turner v. John Farrell—Claim £8 8s, for cordial supplied and empty bottles not returned.

James Turner, cordial manufacturer, Geraldine, deposed that he had charged defendant with empty bottles not returned, and defendant refused to pay for same.

Figure 4: Canterbury Newspaper Notice of Court Proceedings about the Issue of Bottle Return (Temuka Leader 23/08/1894).

There were three main ways in which a bottle travelled through the reuse cycle. Firstly, the customer could have returned the bottle to a shop or merchant and purchased more of the same or a different product for the cost of the product only (Lucas 2002; Woff 2014). Or they may have paid a discounted price reflecting the cost of the product versus the bottle (in this case, refilling the same bottle from the shopkeeper's bulk stores) (Busch 1987). The customer would have had to wash the bottle themselves before it was re-filled and these bottles were not necessarily the typical form of bottle used for that particular product (Busch 1987; Woff 2014).

Secondly, the customer could have returned the bottle to the shopkeeper and been reimbursed for the cost of the bottle without purchasing anything else (Busch 1987; Woff 2014). The shopkeeper would then sell the bottle to a marine store dealer, bottle merchant or factory for sorting, washing and cleaning and, once returned, to a product manufacturer, for refilling (Woff 2014).

Finally, the customer could have taken the bottle to a bottle merchant or marine store dealer to be exchanged for money (Busch 1987). The bottle would then be washed and sold to a manufacturer who would fill the bottle with their product (Woff 2014). With this system, bottles were not always returned to the

manufacturer who last filled the bottle (Woff 2014; Ellis & Woff 2017). This also occurred if the customer had washed and refilled the bottle themselves within the household context (Hayes 2008; Woff 2014).

Another important factor of the bottle reuse cycle is the point where the bottle exited the cycle and this could happen for two reasons. The bottle could have been modified and recycled to serve some purpose other than as a container for beverages and other liquid products and therefore it exited the cycle. A couple of examples of these modifications are preservation jars (Stuart 1993) and building supplies (Adams 2002). After or instead of being recycled, the bottles could have been discarded. The possibilities for discarding a bottle were extensive and may have been due to breakages or because the bottle was not seen as an item of value. Once discarded, the bottle then enters the archaeological record to be later discovered and analysed.

1.4: Outline of Thesis

This chapter has provided an introduction to the background of bottle reuse and the bottle use wear scale that will be the main method for the analysis. It also includes the five different contexts that had bases measured and studied as well as the seven main research questions that will be answered during the analysis. It explains what exactly bottle reuse is and the problems pertaining to it within archaeology. The following chapter provides a detailed background of the literature based on historical archaeology and material culture studies, use wear in historical archaeology, glass and the history of its manufacture as well as bottle reuse in archaeology.

Chapter three contains a comprehensive synopsis of the history of Christchurch and Canterbury, including a large section on Victorian Christchurch. It is followed by a detailed section on the history of drinking in not only Christchurch but in New Zealand overall.

Chapter four familiarises the main context that was the first site to be measured by the bottle use wear scale (Bottle Exchange at 15 Lawson Street). It provides a site history, an archaeological investigation and the summary of the site context. A methodology is outlined in chapter five explaining the process of the development of the use wear scale as well as the methods used to analyse the bases that were measured. Chapter five also describes the four comparison contexts.

The results of the analysis are provided in chapter six. Chapter seven discusses the results in more detail. The first part determines what context reused its bottles most commonly and discusses the reasons for this. The second part discusses the variation of use wear on all bottle types, including specific alcohol bottles. The third part contains a description of the use-reuse cycle in Victorian Christchurch based on the use wear results. The last part of chapter seven contains interpretations pertaining to the use wear/reuse of the bottles and about the social and daily life of Victorian Christchurch with an emphasis on the drinking culture.

Finally, chapter eight will summarise what was learnt throughout the research and analysis of this thesis. The final part will determine if the scale could become a valuable tool in archaeological analyses and will make suggestions for the direction of future analyses.

Chapter 2: Historical Archaeology, Use wear and Bottles

Bottle reuse is a subject that has not been studied a great deal in New Zealand archaeology. This chapter will examine international literature on bottle reuse and its importance to the study of archaeological sites. It will also set this within the broader context of historical archaeology and material culture studies and explore literature pertaining to use wear studies in historical archaeology and the history of glass and bottle manufacturing.

2.1: Historical Archaeology and Material Culture Studies

The study of material culture is essential for archaeologists to understand people of the past. Archaeologists are no longer antiquarians, motivated by curiosity and money to collect items from the past for themselves or for private/public collections (Chase et al 2006; Lynott 2003). Archaeologists now use these artefacts to understand people of the past through methods such as excavation and laboratory analysis (Renfrew & Bahn 2008). This is why the study of material culture is critical to archaeology, including historical archaeology and other sub-disciplines.

Historical archaeology is most commonly defined as the archaeological study of the period from approximately AD 1500 up to and including the present, i.e. recent/modern history (Hicks & Beaudry 2006; Orser Jr 2004). It studies the cultural remains of the literate societies that were capable of recording their own histories (Deetz 1996).

As with archaeology in general, the study of material culture is a very important method used in historical archaeology. Material culture studies focus on the 'things' that people of the past dealt with in their daily lives and what these objects meant to those who made and used them (Cochran & Beaudry 2006; Grant, Gorin & Fleming 2008; Renfrew & Bahn 2008). The term 'material culture' refers to "the artefacts and structures which were made and used by past people" (Grant, Gorin & Fleming 2008 275) but can be defined in a broader way as "that sector of physical

environment that we modify through culturally determined behaviour" (Deetz 1996 35). This definition includes all artefacts, from the simplest like a pin or nail, to the most complex, such as a car, but also includes the physical environment (Deetz 1996; Gamble 2007).

There are three main ways in which material culture is studied. The first method involves describing and recording artefacts (Lawrence 2006). The second is the most common method and is somewhat of a biographical approach according to Grant, Gorin & Fleming (2008). This considers the use of an object, how it was made and the materials used in making it (Cochran & Beaudry 2006; Grant, Gorin & Fleming 2008). The third method aims to interpret the symbolic meanings embedded in objects such as social identity, community values, beliefs and social structure (Cochran & Beaudry 2006; Deetz 1996; Grant, Gorin & Fleming 2008; Hodder 1991).

The material culture that historical archaeologists study is very different to that which prehistoric archaeologists study. For example, historical material culture includes, but is not limited to, glass bottles, nails, bullet shells, coins, modern ceramic items, smoking pipes, leather shoes, clothing fabric etc. whereas prehistoric material culture often consists of stone and bone tools, faunal material, weapons, and sometimes ornaments and jewellery, such as necklaces (Barker & Majewski 2006; Caple 2006; Cochran & Beaudry 2006; King 2006; Light 2000; Orser Jr 2004; Renfrew & Bahan 2008). Although there are considerable differences between the materials used and the artefact forms produced by prehistoric and historic communities, the ways in which material culture is studied do not differ or change between historic and prehistoric archaeology (Cochran & Beaudry 2006). The study of material culture is central to all time frames of archaeological research. It is the main method that archaeologists use to interpret the past.

2.2: Use wear in Historical Archaeology

Use wear is physical evidence of the way in which an artefact has been used. It can be found on almost any artefact that has been used extensively or for a lengthy period of time. Use wear studies have usually been conducted on prehistoric artefacts such as stone tools (Caple 2006; Fullagar 2006; Grant, Gorin & Fleming 2008; Renfrew and Bahn 2008). According to Caple (2006 185), "Microwear (Use wear) on prehistoric lithic artefacts is the only area where wear has been studied to the point that it has become a significant analytical tool for archaeologists". Studies of use wear on historic artefacts only began in the last 30 to 40 years and have only recently become something of importance, which is why there is a significant gap in the literature about use wear on historic artefacts.

Shoes are one category of historic artefacts that have been examined for use wear. Shoes eventually wear through and are either repaired or discarded. Studies on the traces of wear, plus evidence of holes and the splitting of seams, on shoes recovered from excavations in London revealed that complaints such as bunions and hammer toe afflicted the citizens of London in the 15th Century (Caple 2006; Grew & de Neergaard 1988). Other textiles, as well as ropes and leather, are made up of microscopic fibres. These fibres develop rounded ends as a result of rubbing and gradual wear. Irregular broken ends derive from bursting or tearing and flexing causes fraying. Smooth flat ends come from cutting with a knife and stepped ends develop from cutting with scissors or shears. These actions cause the woven matrix of textiles to gradually loosen and give rise to frayed edges, familiar on collars and cuffs, due to the prolonged wear (Caple 2006). Metal objects have also been examined as the edge or point of any tool will become blunt, rounded and less effective with wear. Tools such as axes, sword blades, pins, needles, knives, chisels, scissors, saws and drills have been studied because it is easy to determine which have been most frequently used. When tools become less effective, they are either discarded or sharpened, however, repeated sharpening wears away the edge of the blade and can also change the shape of the blade (Caple 2006; Neergaard 1987; Saez & Lerma 2015).

Clay tobacco pipes are among the most studied historic artefacts with regard to use wear or evidence of use. This is because the information they provide helps archaeologists to determine the nature of the material as well as the consumption patterns (Bradley 2000; Lawrence 2006). For example, a lack of teeth marks and smoking stains on broken pipes may be an indication of damaged cargo, rather than of personal possession. Extensively repaired and reworked pipes might suggest poverty or that replacement pipes were not readily available (Lawrence 2006). Teeth marks on pipe stems are one of the more common use-marks on pipes and are caused by clenching them between the teeth, an activity that gradually abrades the surface of the stem (Akerhagan 2001; Bradley 2000; Brassey 1991; Cessford 2001; Gojak & Stuart 1999; Heard 2000; Lawrence 2006). Smoking stains found within the bowl and, in some cases, radiating out from the bore of the stem are clear evidence that a pipe was utilised and the degree of staining reveals how much a pipe was smoked. The stains can range from a light grey colour to blue and black (Bradley 2000; Brassey 1991; Gojak & Stuart 1999; Lawrence 2006). Other use wear marks primarily on clay pipes include:

1) Charring/burning - exposure to high heat, such as a house or rubbish fire, can cause clay pipes to become semi-vitrified, approaching a near-porcelain-like state.
2): Chipping - found in the bowl interior and resulting from ash extraction.
3) Spalling - pock marks caused by exposure to fire or salt or by freezing and thawing.
4) Abrasion - marks imparted on pipe fragments once discarded. These are gouged surfaces caused by grinding underfoot.
5) Trowel Marks - not evidence of use but are recorded in order to be distinguished from the other marks (Bradley 2000; Gojak & Stuart 1999).

Clay pipes were also re-worked and these markings tell archaeologists that these pipes were used extensively. Re-working was carried out for three main reasons:

1) to customise an individual pipe, 2) to prolong the life of a pipe and, 3) to adapt the pipe or pipe fragments for alternative uses (Bradley 2000; Gojak & Stuart 1999; Sudbury 1978; Walker 1976).

Historic-period ceramics such as tea-cups, plates and bowls are another class of items that need to be considered regarding use wear as there is limited information available on this topic. A preliminary study by Dorothy Griffiths (1978) is the one piece of literature that looks at use-marks solely on modern earthenware and porcelain items. By using prehistoric methods and items from Canadian historic sites and English museums, she discovered that the study of use-marks is feasible on historic ceramic material and not just prehistoric ceramics. There has been very little progress on the research of use wear on historic-period ceramics and, furthermore, it is widely known that household items such as ceramics were usually discarded due to over-use and were covered in use-marks or broken (Butcher & Smith 2010; Griffiths 1978; Owens et el 2010). Some academics recognise the potential of the analysis of use-marks but do not delve further into the topic (Barker & Majewski 2010). It is worrying that it appears that there is no literature about any household items, other than modern ceramics, being studied relating to use wear as these items are more commonly found in historic sites than any other classes of artefacts. Studies focusing on use wear on historic items are just as relevant as the study of use wear on prehistoric items. This is why one of the main focuses of this thesis is use wear on glass bottles.

2.3: Glass

Before turning attention to the study of use wear of glass bottles it is important to consider the nature of glass as a material and the processes involved in manufacturing artefacts from it. The former influences its propensity to show evidence of wear while the latter can produce markings that need to be distinguished from those produced during usage.

Glass is a combination of silica, soda (sodium carbonate) or potash (potassium carbonate), and lime that has been melted down at high temperature and then moulded into a variety of shapes (Dungworth 2012; Grogan 1997; Lawrence 2006; Mehlman 1982; Renfrew & Bahn 2008). The most important part of the batch is the silica, comprising 60 to 70% of the final mixture. It has to be kept largely free of

impurities (Grogan 1997; Hutchinson 1987). When the ingredients of the batch are combined, it is then heated, usually in a furnace. The heated mixture becomes soft and malleable, allowing it to be formed by various methods into a range of forms or sizes (Grogan 1997; Grose 1984; Renfrew & Bahn 2008). The mass resulting from melting cools to create glass (Grogan 1997; Grose 1984; Lawrence 2006; Renfrew & Bahn 2008).

Bottle glass is the most commonly found glass in historical archaeological sites. Due to the fact that glass lacks the crystalline structure associated with solids and instead retains the random molecular structure of a liquid, it becomes progressively softer as the temperature rises until it eventually flows as a thick syrup (Grogan 1997; Renfrew & Bahn 2008). This is how glass is easily formed into completely different shapes. When made into thin items glass is susceptible to fracture, but more robust items may sustain chipping, scratching and other types of abrasion during use and can thus be studied for use wear.

2.3.1: History of Glass Manufacture

It is widely known now that the earliest glass was developed in Mesopotamia, approximately around 3000-2500 BC (Grogan 1997; Lawrence 2006; Mehlman 1982; Renfrew & Bahn 2008). Previously, glass was thought to have been invented in Egypt (before 3000 BC), however it has now been discovered that the Egyptians produced a substance similar to glass called *faience*. This was made by coating a core material of powdered quartz with a vitreous alkaline glaze (Grogan 1997; Renfrew & Bahn 2008). Real glass vessels did not appear in Egypt until approximately 1500 B.C (Egyptian New Kingdoms 18th Dynasty). The earliest dated glass furnace is that at Tell-el-Amarna, Egypt, dating 1350 BC.

Vessels were made by one of four techniques that were used before the invention of glass blowing. The first was called the lost wax method where molten glass was fashioned around a clay core, which was scraped out once the glass had cooled. The other three methods were: 1) sections of coloured glass rods fused to a core, 2) cutting from raw blocks of glass, and 3) casting in moulds (Grogan 1997; Renfrew

& Bahn 2008). By 700 BC all the principal techniques for making glass had been developed except for one: glass blowing. It was not until approximately 50 BC that this quick and cheap method was finally achieved by the Romans. This technique remained virtually unchanged until the seventeenth century (Grogan 1997; Lawrence 2006; Mehlman 1982; Renfrew & Bahn 2008).

The method of glass blowing is straightforward and extremely effective and this is why glass-makers have been using this technique for over 2000 years. It involved an iron blowpipe, approximately six feet in length, being heated at its thickened end so that the glass would adhere to it. It was then plunged into a crucible to collect a blob of hot glass (or a gather) (Grogan 1997; Renfrew & Bahn 2008). The gather was then rolled on a marver (a marble or iron slab to make it smooth and symmetrical) and was reheated and formed into a bubble by blowing through a wooden mouthpiece at the other end of the pipe (Grogan 1997). The reheating and blowing process could be repeated several times, until the desired size, shape and thickness was achieved. With this technique, simple bottles were made quickly and easily as the bottle was a natural development of the simple bubble produced by glass blowing. However, in order to make more complex bottles, moulds were required (Grogan 1997; Lawrence 2006; Polak 1975). The first moulds were made of carved wood, stone or clay and they were initially made up of one or two pieces. Later, moulds consisting of three or four pieces were used for more complex designs (Grogan 1997; Lawrence 2006).

Glass manufacturing changed little from the Roman times until the 19th century when new machine operated methods were developed in the US and then spread to Europe. One of these methods involved a process where glass was blown into metal moulds from a source of compressed air that was mechanically controlled. Another method, which was developed in 1827 in the US and spread to Europe in the following decade, was mould pressing. Molten glass was poured into a metal mould and pressed by a plunger from which it took its shape and decoration. These methods were part of the most important technological changes in bottle manufacturing in the 19th century and made the 19th century a transitional phase in bottle making (Dungworth 2012; Grogan 1997). Archaeologists can determine what

technique has been used to produce specific bottles due to the distinctive markings left by each type of manufacturing. For example, free-blown bottles are asymmetrical and irregular in shape and size whereas mould-blown bottles are more regular and usually have one or more seams from the moulding process (Lawrence 2006).

Because moulds were utilised in the process of bottle making for centuries, a description of the common types would be useful. There are many different kinds of moulds and Grogan (1997) notes that Baugher-Perlin (1982) has provided a description of some of the main ones; others are described by Lindsey (2017). The simplest form is a one-piece dip mould, used from the late 17th century to the 1850s. This sometimes had no mould seam, or at most, a single horizontal line around the widest part of the body. According to Lawrence (2006) some will also have two additional seams running vertically up to the shoulders to the finish. These bottles were made in a three-piece dip-mould, a cup with two hinged sections attached to form the shoulders. Moulds of this kind were used from around 1820 to 1920. Bottles made with the one-piece dip-mould would have had the shoulder and neck hand finished. Another easily recognisable form is a hinged bottom mould or two-piece mould which had a seam line across the underside of the base, as well as along the side of the body. This mould form was in used from 1750 to circa 1880. The common three-piece mould was developed in 1802 and became widespread after 1821 when Henry Ricketts of Bristol patented his version. The three-piece moulds began to be replaced with two-piece types around 1850 and these are commonly seen on many New Zealand bottles produced from the 1870s onwards. The three and two-piece moulds include the shoulder and neck but not the lip, which was applied separately by hand. Furthermore, both types could be used with a separate base-plate, a disk that fits into the bottom of the mould and leaves an additional seam around the heel or kick-up (Baugher-Perlin 1982; Dungworth 2012; Grogan 1997; Lawrence 2006; Macready & Goodwyn 1990). The last variety of hand-blown bottles are those made from turn-moulds. They are recognisable by slight horizontal lines on the body and were in use from the 1870's to as late as the 1920's in some locations (Baugher-Perlin 1982; Dungworth 2012; Grogan 1997).

It was not until the 20th century that the use of machine made bottles became increasingly widespread. The earliest, fully automated bottle machine was patented by an American, Michael J Owens, in 1903. This system was also based on the use of moulds but developed the finish of bottle first and then the base. Soon almost all bottles were being made in this manner (Dungworth 2012; Grogan 1997; Lawrence 2006; Miller & Sullivan 1984). The seams left by this process are quite different to those on mould-blown bottles and machine-made bottles are readily distinguishable. Two separate moulds are used, one for the finish and one for the body and base. The second mould obscures the seams from the first mould, so that the bottles have a faint wavy ghost seam running parallel to the more obvious one. Because the finish is also made in a mould, the seams on a machine-made bottle run right up the neck and finish, rather than stopping at the neck as on mould-blown bottles. There are also several horizontal seam lines on the finish, but no indication of extra glass being added (Dungworth 2012; Lawrence 2006).

Due to these different methods of manufacture, it is usually easy to determine the type of bottle as well as the approximate date it was made. Archaeologists can analyse bottles in great detail, beginning with the different types of finishes. For example, machine-made bottles had seams on the finish whereas the earliest types were simply sheared off with a blade. Around the 1840's lips began to be formed with a variety of lipping tools, which utilised a separate laid-on ring glass. As a general guide, lips applied after the 1870s are more complex and elaborate and are less easily detectable as being separate constructions from the rest of the bottle (Grogan 1997; Lindsey 2017). The pontils used to hold bottles while the tops were applied also went through various stages of development which makes them easier to analyse. The earliest pontils were dome-shaped metal rods that were attached to the bottle by smearing it with a small quantity of molten glass which was then pressed into the base of the bottle. Once the top was completed, the pontil rod was removed by applying cold water to the place where the pontil rod joined the bottle, causing the glass on the pontil head to shatter and snap off. This left a jagged scar on the base of the bottle. Due to its unsightly appearance and the fact that occasionally the bottle could not stand properly, the snap pontil or glass pontil was phased out around the 1870s in favour of the bare iron pontil. This method utilised

a cone shaped pontil rod that was heated to red-hot before being pressed into the base of the bottle. Bare iron pontils were very commonly used for 'black beers that were most popular in the 1870s. This was because they had the advantage of detaching more easily and without scarring' (Grogan 1997; Lawrence 2006; Smith 2004; Tasker 1989).

Bottles and other glass vessels have been discovered in the majority of historic archaeological sites excavated in New Zealand. Many of these examples display the manufacturing techniques outlined above. Unfortunately, dating proves quite difficult when it comes to glass bottles due to an issue called reuse. This problematic topic will be discussed in the next section.

2.4: Bottle Reuse in Archaeology

As with use wear in Historical Archaeology, bottle reuse has been covered in many different studies, but rather than being studied as a whole, it has been separated into different aspects of the topic. Woff (2014) accurately states that more research needs to be done on the whole topic of bottle reuse so it can be properly understood. Bottle reuse is different to the current recycling practices whereby glass is melted down in order to be created into new objects or bottles. In the past, the physical bottle was simply washed and reused in its original form (Argus 1880; Caple 2006). It is important to note that reuse is the use of an object in its original form without modification and the primary function of a bottle being a container does not change, although the product which is held in the bottle may do (Caple 2006; Gamble 2015; Skibo & Schiffer 2008; Woff 2014; Ellis & Woff 2017). It therefore differs from when a bottle has been obviously modified for another purpose. Some examples of modification include glass flaked to become cutting implements (Harrison 2000; Ulm et al 2009), bottles shortened to become preserving jars (Stuart 1993), bottle bases cut to enable the smoking of opium as found at the Chinaman's Point excavations (Bowan 2012) or bottles being used as building supplies (Adams 2002).

Previous studies that have looked at bottle reuse in the correct sense have either outlined the basics of the bottle reuse cycle (see Chapter 1 for the full bottle reuse

cycle) (Busch 1987; Lucas 2002), or recognized the commercial reuse of alcoholic beverage bottles for cordial (Carney 1998) or identified bottles which did not always carry products traditionally linked to their form. For example, after the ship *William Salthouse* sank in Port Phillip Bay, Australia, 1841, it was discovered that beer was being transported in champagne bottles (Peters 1996). Similarly, a study of paper labels surviving on bottles from the Wanganui Hotel, New Zealand, showed that a small proportion of bottles held products that differed from what was usually associated with the bottle type concerned (Harris 2009). Bottle reuse has not been studied as a whole but many facets of the topic have been examined singularly. It is especially difficult to find literature on bottle reuse in New Zealand. When it is mentioned, it is done fleetingly (Grogan 1997).

Although literature on identification and dating are useful in the study of bottles (Adams 2003; Stell-Newman 1970; Smith 2004; Woff 2014), reuse is important to understand as it changes the interpretation of not only the bottles but also of the site. It also makes dating difficult. Reuse should be addressed as a potential occurrence in every site, especially in New Zealand, and unfortunately this is not always the case. For example, Piper's (1988) analysis of artefacts associated with food consumption by 19th century Chinese miners in New Zealand included different types of bottles (food related, condiment and alcohol bottles) but did not include any mention of reuse. This neglect may have occurred from a need to simplify the collection or the interpretation of the site (Lucas 2002) or it may have been seen as the best available option. Whichever the case, it presents a potentially biased and inaccurate interpretation of the site (Woff 2014). Lawrence (2000) and Woff (2014) state that others, such as Hill (2003), do acknowledge reuse but go on to use bottles as evidence for their original contents.

Fortunately, there have been researchers who acknowledge and address this problem, taking reuse into account when analysing and interpreting the artefacts. Woff (2014) outlines two examples. The first is from a paper by Davis (2006) on the Casselden excavations, which discusses the uses of beer/wine bottles not only as multi-purpose alcohol containers, but also as containers for various kinds of cordials, aerated waters and other household products. The second example is

Hayes's (2008) analysis of the artefacts from the middle class domestic Viewbank Homestead excavations. This acknowledges the difficulty in proving whether alcohol bottles were solely used for storing alcohol and categorises them under "storing food" rather than in a category related to recreational drinking. Hayes also acknowledges that bottles were reused in a number of ways, being refilled during various domestic activities or through the commercial activities of bottle merchants and manufacturers.

Although bottle reuse has been taken in account in some cases and has been studied by Woff (2014) and Ellis & Woff (2017) extensively, it still needs to be more thoroughly investigated, especially in New Zealand where it was a common occurrence. Literature about reuse in New Zealand historic sites is sorely lacking and this thesis hopes to fill some gaps around reuse and the use wear of glass bottles.

Chapter 3: Christchurch and the Drinking Culture in Victorian Times

3.1: Historical Background of the Canterbury Region

3.1.1: Pre-European Colonial History

Canterbury had a relatively small Maori population at the time of the European discovery, as was the case in other South Island provinces. Nonetheless, by the time Europeans settled in Canterbury, the province had a Maori history of several centuries (Rogers 2007; Wilson 2012). This history goes back to the arrival of the *Uruao* canoe. It's captain, Rakaihautu, arrived in New Zealand on a passage that was chopped through the seas by the sacred adze Kapakitua. After sailing around the South Island (visiting Nelson and Foveaux Strait), he joined his son, Rakihouia, at Waihao but eventually settled on Horomaka (Banks Peninsula) (Anderson 1998; Wilson 2012; Figure 5). 'Waitaha', his iwi (tribe), was one of the first of several iwi to settle in Canterbury (Ogilvie 2007; Wilson 2012).

The name 'Waitaha' has had various meanings, some legitimate and some not. The most recent claim suggests that the 'Waitaha' were a multi-racial people who inhabited New Zealand for a thousand years before the arrival of the Maori, however, there is no evidence of this. The authentic uses of 'Waitaha' are different. Firstly, it is a general name for the various groups who existed in the South Island after the arrival of Rakaihautu and prior to the arrival of Ngati Mamoe (Anderson 1998; Rogers 2007). Secondly, Waitaha refers specifically to the descendants of Waitaha Nui and Waitaha Ariki who occur in southern Maori whakapapa. We could assume, for the sake of argument that Waitaha Nui lived during the 15th Century or thereabouts (Anderson 1998). These early Polynesians left traces of their occupational and hunting sites on the Canterbury coastline with well-documented locations on Banks Peninsula at Purau, Panau, Okains Bay, Tumbledown Bay and Takematua, plus Redcliffs to the north and to the south, Kaitorete Spit (Challis 1995, Ogilvie 2007; Figure 5). For example, numerous kitchen middens with moa, marine mammal and other species of bird have been found in Redcliffs Flat. Areas where

adzes were flaked out of basalt, found locally, were excavated at Tumbledown Bay along with an impressive amount of fish bones, of which barracouta and maka were the most prominent. Maori fortifications of single enclosures, rectangular in plan, were found in Panau (Challis 1995).

Due to Canterbury's cold climate, the growing of kumara and other Polynesian vegetables the Waitaha had brought with them proved to be difficult (Wilson 2012). They therefore had to find some other sources of food, of which a main one was the moa (a large, now extinct, flightless bird), which flourished on Canterbury's grass and scrublands (Figure 6). The moa was an ideal prey as its vast size housed a great deal of meat and its inability to fly made it very easy to capture and kill. It also provided bones for use as ornaments as well as fishhooks (Rogers 2007; Wilson 2012). Seven moa species have been identified in Canterbury archaeological sites including *Dinornis giganteus* (giant moa, identified only in Redcliffs Flat and the Moa-bone Point Cave). They were usually found in open forests and shrublands with margins to adjacent swamps and braided streams whereas the *Anomaloperyx didiformis* (little bush moa) and *Dinornis novaezealandiae* (large bush moa) occupied dense wet lowland forests and have been identified in coastal sites only including Horomaka (Challis 1995). Sites that produced moa remains exist across the Canterbury Plains such as the Rakaia River Mouth and the Waihao River Mouth. A large quantity of burnt and fragmented moa bones was found at the Rakaia River Mouth as well as up to 1,000 ovens (Challis 1995). Moa, along with other giant birds, were hunted to extinction in a little over a century. The extinction of the moa was furthermore propelled by the considerable amount of forest burned by the Maori in the Canterbury region over this colonising period of 100-150 years in the 13th century (Rogers 2007).

Figure 5: Map of Significant Maori archaeological sites in Canterbury (Challis 1995 pp.2)

Figure 6: Map showing the Distribution of Identified Moa Remains (Challis 1995 pp. 12).

After the disappearance of the moa, Maori in the 14th and 15th centuries had to adapt to new ways of feeding themselves such as gardening, foraging and snaring, particularly smaller birds such as weka. They also continued to fish and gather shellfish. Two-piece fishhooks found in Panau, Tumbledown Bay and Moa-bone Point Cave is evidence of this practice because two-piece fishhooks are characteristically a late-period item (Challis 1995). From the 16th century, North Island Maori tribes began arriving in the Canterbury area in order to conquer and take control of the resources that were available in the region (Rogers 2007). Ngati Mamoe,settled in the Wairau district. Shortly after, the southward push of the Ngati Kahungunu peoples into the Wairarapa induced many Rangitane and also Ngai Tara and Ngati Kuia to exchange land for canoes and depart across the Strait.

In the South Island, the pressure of new arrivals persuaded Ngati Mamoe to relinquish Wairau to Rangitane and move to the Kaikoura coast, establishing themselves principally at Waipara, although some families had begun to move further south to settle amongst Waitaha (Anderson 1998). Ngai Tahu was another tribe whose aim was to conquer the south. They were closely connected with the Ngai Kahungunu peoples, especially Ngati Ira, but also with Ngai Tara and Rangitane. These people share with Ngati Mamoe, Ngai Tahu and Ngati Porou a common ancestral nest in the Hawkes Bay (Anderson 1998). The Ngati Mamoe and Ngai Tahu, 'appear' to have co-existed with the Waitaha on the basis of rough parity with hapu groups (sub-tribes) intermarrying, feuding and allying across tribal lines. By the 18th century, the area that would become known as Canterbury was undeniably Ngai Tahu territory after continuous raids and feuding among the Waitaha, Ngati Mamoe and Ngai Tahu. Explained simply, the Waitaha were killed by the Ngati Mamoe but then they, in turn, were destroyed by the Ngai Tahu (Anderson 1998). The present day Ngai Tahu iwi consists of a collective of the individuals who descend from the five primary hapu of Nagi Tahu, Ngati Mamoe and Waitaha (Rogers 2007). February 1770 was the start of the European discovery of Canterbury when Captain James Cook, sailing the *Endeavour,* made the infamous discovery of the eastern coast of the South Island, namely Banks Peninsula, which he thought to be an island (Rogers 2007).

3.1.2: Whalers and Early Farmers

The story of Canterbury's settlement by Europeans began in the 18th century when Captain James Cook not only discovered New Zealand but made contact with the Maori people during all three voyages. However, his relationship with the Maori was not always cordial. One attempt to prove they were friendly occurred in 1773. This time, he was in the *Resolution* and the Englishmen offered gifts such as hatchets and spike nails. Cook and his men also left potatoes, which would prove an essential trade item for Maori seeking European iron and steel tools (Rogers 2007). In the early 19th century, whalers from the northern hemisphere discovered that whales migrated in great numbers up the coast of the South Island (Wilson 2012). Prior to this, Europeans had noticed there were also large numbers of seals on the coasts of South Island. This led to Horomaka, as Banks Peninsula was known to Maori, becoming a common refuelling destination for visiting European ships on the hunt for seals and whales (Rogers 2007). Between 1810 and 1830, war broke out among the Ngai Tahu sub-tribes (Kai Huanga feud) and also the North Island tribe, Ngati Toa. The numbers of Ngai Tahu were vastly reduced (from between 8000 and 9000 to 5500) over the years of the Kai Huanga feud and the Ngai Toa attacks (Rogers 2007).

During these war-ravaged years more Europeans, mostly in French, American and British whaling ships, were finding their way to the South Island. The first stage of whaling, predominantly in pursuit of sperm whales and taking place at sea on ocean-going vessels, had begun around the turn of the 19th century and from then on vessels called regularly at New Zealand harbours (including Horomaka) to take on fresh water, food and timber (Rogers 2007). The second, shore-based phase of whaling, mainly in pursuit of the southern right whale, had begun in New Zealand in 1827. Try-works (in order to turn whale blubber into oil) were built in suitable bays and boats were sent out each day to hunt (Figure 7). Banks Peninsula and South Canterbury were eventually locations of these sites (Rogers 2007; Wilson 2012). From the mid-1830s through the 1840s several shore-stations operated in different bays on Banks Peninsula. One of the best known was Peraki on the southern side of the Peninsula (Rogers 2007). Each whaling station required a

complement of at least 30 men (six or seven to man each of the four whaleboats and a number working permanently on shore). It has been estimated that, by 1840, almost 90 Europeans were living on Banks Peninsula (Rogers 2007). While the North Island Maori chiefs signed the Treaty of Waitangi on the 6th of February 1840, the chiefs of Ngai Tahu signed the treaty on not only the 30th of May at Onuku in Akaroa Harbour and also on the 10th of June at Ruapuke Island and on the 13th of June at Otakou. New Zealand thus became part of the British colony and Christchurch was going to be a British settlement. In August 1840, Captain Owen Stanley arrived on the *HMS Britomart* to rise the Union Jack at Akaroa, barely a week before 63 French colonists arrived on the *Comte de Paris* (Rogers 2007).

Figure 7: Heavy Iron Try-pot in which Blubber was heated to extract whale oil. This one is located in Oashore on Banks Peninsula (Wilson pp. 10).

Other than whalers and sealers, early farmers were some of the first Europeans to colonize Canterbury. The first European settlers within the present boundaries of Christchurch were two small groups of farmers who arrived from Sydney in April 1840. Led by James Herriot, whose backers had bought over 7,000 acres in

Putaringamotu (Riccarton) from one George Weller, they believed that they had bought the land from Ngai Tahu. Their first crop was successful but they gave up after 18 months due to a plague of rats and the isolation of their environment (Rice 2008; Rogers 2007; Wilson 2012). Fortunately, the second attempt at a European settlement of the Port Cooper Plains (Canterbury Plains) was much more successful. It was carried out by two Scottish Presbyterian brothers - William and John Deans. They were accompanied by two other families, the Mansons and Gebbies, who were to be their farm workers (Ogilvie 1996; Rice 2008; Rogers 2007; Wilson 2012).

3.1.3: The First European Settlers of the Canterbury Plains

Although Canterbury was founded later than the other main New Zealand settlements, in 1843, two Scottish Presbyterian brothers, William and John Deans, established the first permanent European farm on the Canterbury Plains (or Port Cooper Plains) with the help of two other families, the Mansons and the Gebbies (Ogilvie 1996; Rogers 2007; Rice 2008; Wilson 2012). William and John developed an interest in emigrating at an early age and on the 22nd of January 1840, William arrived in Wellington and became the first European to settle and farm on the eastern shores of Port Nicholson. Unfortunately, the 200 acres he received from the New Zealand Company was not ideal for farming and therefore he went exploring in the north for decent farming land. John, in 1842, was amongst Nelson's earliest settlers (Figure 8). Tired of bumbling administrators and land hassles (John's land was also ill-suited for farming) in both Nelson and Wellington, the Deans brothers decided that their opportunity as farmers lay further south. Thus, 1843, William and John Deans, with the Mansons and Gebbies, pioneered the settlement of what was then known as Port Cooper Plains (Deans 1964; Ogilvie 1996).

Figure 8: Portrait of John Deans (Ogilvie, pp 74.)

Figure 9: The cottage that housed the Deans brothers as well as the Manson and Gebbie Families (Ogilvie 1996 pp. 39).

For seven years, the Deans farmed at Putaringamotu, later to be renamed Riccarton (Figures 9 & 10). John Deans returned from New South Wales on the 17th of June 1843 with the stock and provisions required for the new land that the brothers had bargained with local Maori owners to originally squat on but later to lease (they organised a 21-year lease for 33,000 acres for 8 pounds a year). The Gebbies and the Mansons families left in 1845 to set up their own farm on Banks Peninsula. A couple called the Todds replaced them as their cook and farm workers. In 1850, large groups of the Canterbury Association members began arriving and the brothers fed and housed the pilgrims as well as assisting them with legal issues involving land. Every day, Mary Todd cooked for 50 to 100 people (Deans 1964).

As part of the negotiations for land with the Canterbury Association, the Deans were able to swap their North Island land titles of unusable farmland for 400 acres at Riccarton Farm. It was their idea to form a 500-acre buffer between Riccarton Farm and the new Christchurch settlement. This was eventually to be called Hagley Park. They also exchanged the 33,000 acres of lease land for a farm block, near Darfield on the Canterbury Plains, which they called Homebush (Figure 11). It was the site for coal mining and homemade brick making from which Christchurch greatly benefitted (Deans 1964, 1971; Ogilvie 1996). In 1851, tragedy struck the Deans family when William sailed for Australia to buy more stock. The ship, *Maria,* on which he had taken passage was wrecked off Cape Terawhiti on the 23rd of July 1851 and he drowned (Deans 1964).

Figure 10: J.W Barnicoat's sketch of the Deans farm in April 1844 (Ogilvie 1996 pp. 42).

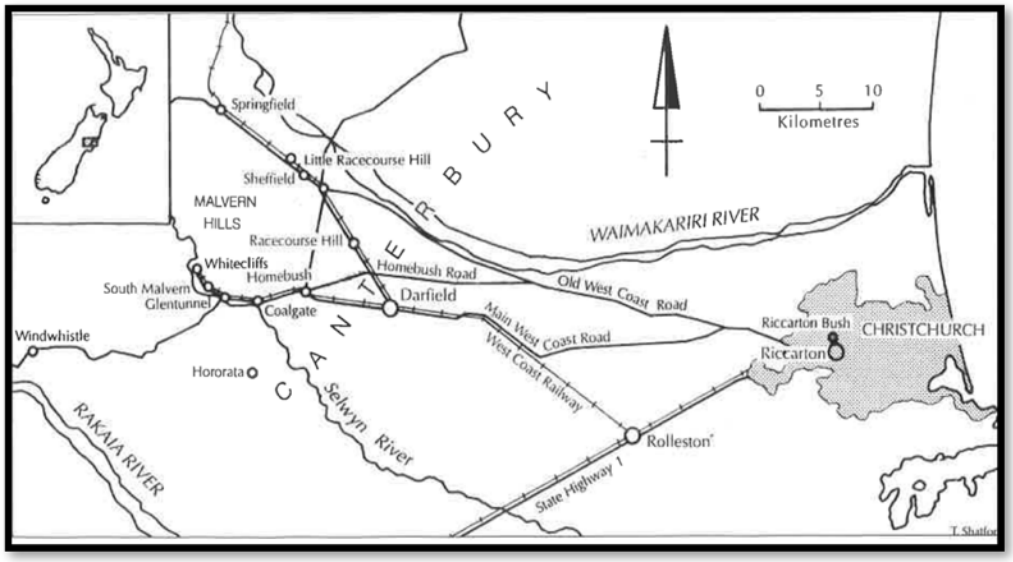


Figure 11: Map slowing the location of Riccarton Farm and Homebush. (Ogilvie pp. 82

Following the disaster of William's death, John returned to Scotland in 1852 once he had straightened out the farm's affairs (Ogilvie 1996). The cause for his return was to marry his long-term love, Jane McIlraith, who had waited for 10 years to once again see her beloved (Deans 1971; Figure 12). They married at Auchenflower, where Jane was born, on the 15th of September 1852. On the 12th of October 1852, the married couple set sail from London to New Zealand on the ship, *Minerva*. They arrived on the 2nd of February 1853 by which time Jane was 3 months pregnant with a boy who was to be born on the 6th of August 1853 (Deans 1971). Homebush Station was established in 1853 and was the first homestead on the Canterbury Plains. It was also the start of the spread of settlement along the plains. Towns such as Leeston, Ashburton, Dunsandel, Darfield and Methven were established in the 1860s and 1870s due to the knowledge of widespread lands for excellent sheep runs and other industries (Wilson 2012). Some towns built their own train stations for easy transport of stock as well as people. (Rogers 2007).

Figure 12: Portrait of Jane Deans (Ogilvie 1996 pp. 74)

In 1853, John's health began to deteriorate and Jane came to realise that their time together was going to be short and therefore she needed to make plans. As Jane was a woman and therefore could not inherit the property, John organised a trust whose trustees oversaw the management and running of Riccarton House until his son, John II, could inherit the farms at the age of 21 years. They were also able to hire a manager named John Cordy to take over the management of Homebush station. Tragically, John Deans developed tuberculosis from his recurring chest infections and he died at Riccarton on the 23rd of June 1854. On his deathbed, he asked Jane to ensure that Riccarton Bush, containing the native flora that surrounded their settlement at Riccarton, remain forever (Deans 1971; Ogilvie 1996). This was to be made a gift to the Christchurch people in 1914.

After her husband's death, Jane decided to stay in New Zealand after intense debate with her father who wanted her to return home to Scotland. Jane wanted to look after the estate because she was one of the three trustees of the estate of the infant John and made the welfare of her baby and the management of the estate until he was old enough to take over, her main concerns (Deans 1971; Ogilvie 1996). During this time, she also started the construction of her new house that was to become Riccarton House. While she was waiting for it to be finished she lived in the old house, now known as Deans Cottage. Jane moved into the house on the 7th of March 1856 before it was finished (Ogilvie 1996). During the same year, Jane's brothers James, Hugh and George McIlraith arrived in New Zealand to assist her. James took

over the management of Homebush station and started to develop it into what it was before the 2010 earthquake (Ogilvie 1996). In 1875, when James was injured, John II took over and continued his work at Homebush while Jane's cousin, Douglas Graham, managed the Riccarton farm. James and John II worked alongside each other until 1895 when James retired and John II took over all of the responsibilities of his inheritance (Ogilvie 1996).

Jane worked tirelessly to preserve Riccarton Bush and within the 10 acres set apart for her at Riccarton under the terms of her husband's will, she planted many trees, both native and introduced (Deans 1971). Jane was also extremely active in the growing community of Canterbury. She was involved in the promotion of the establishment of a 'Scotch Church', called St Andrew's, which opened in February 1857 (Harper 1980; Ogilvie 1996). She also helped in the formation of a Presbyterian academy within the parish and supported the acquisition of land for a Presbyterian cemetery. She was a very loyal supporter of the Presbyterian Church in Christchurch, especially when John II was old enough to take over the estate duties in the 1870s (Harper 1980).

Unfortunately, John II predeceased her in 1902, possibly due to the stress caused by financial worries relating to the Deans estate, and she had to live through another loss after so many before. John II had married Catherine Edith Park in 1879 and left behind 12 children, of whom 9 survived to adulthood (Ogilvie 1996). These grandchildren formed a major part of Jane's life and occupied much of her time. Jane Deans died at Riccarton on the 19th of January 1911 at the age of 88 (Deans 1971; Harper 1980; Ogilvie 1996). She was one of the most remarkable survivors of early Canterbury life and she was, and still is, an inspiration to many people today. The Deans Estate was the start of the Canterbury settlement and was likely the reason for the spread of settlement throughout the Canterbury Plains.

3.1.4: The Canterbury Association and the Beginning of Christchurch

It was in England in November 1847 when an idealistic young Anglo-Irish lawyer, John Robert Godley, met the famous theorist of colonisation, Edward Gibbon Wakefield to plan another settlement in New Zealand (Densem 1990; Rice 2008; Rogers 2007; Figure 13). It was to be the last of the planned British settlements in New Zealand that had commenced with the founding of Wellington in 1840 (Rice 2008). Unfortunately, due to its swampy nature, the site of Christchurch caused the founding of the Canterbury Settlement to be postponed until 1850 but it eventually was to become the most successful of Wakefield's colonisation schemes (Wilson 2012). About eighty labourers and carpenters were brought down from Wellington and Captain Joseph Thomas (an experienced surveyor who was sent to choose the site for the Canterbury Association's settlement) hired another one hundred (half of which were Maori) from Banks Peninsula (Rice 2008; Rogers 2007). Between 1849 and 1850, these men built houses and barracks for settlers and started to form a road to Sumner until funds ran out. The appointed leader of the Canterbury settlement, John Robert Godley arrived at Lyttelton on the *Lady Nugent* on the 12th of April 1850. Initially, he was delighted with what he saw, roads being created and two dozen houses finished, but once ashore, he quarrelled with Captain Thomas over the cost of it all and told the workers to stop (Rice 2008; Scotter 1965).

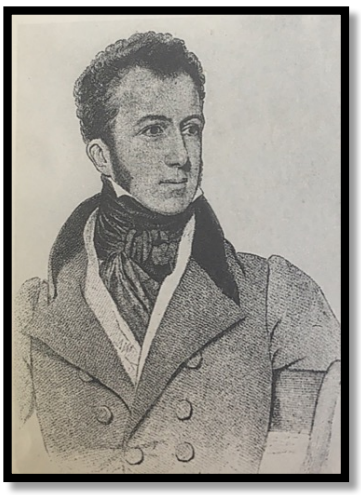


Figure 13: Portrait of Edward Gibbon Wakefield (Rice 2008 pp. 12)

The Canterbury Association had bought the land for its settlement from the New Zealand Company and, in accordance with Wakefield's theory of a sufficient price,

offered intending colonists rural sections in lots of not less than 50 acres at £3 per acre. Purchasers were required to be members of the Church of England and of good character. The Association hoped to sell 100,000 acres to cover its expenses and establish a colony of 15,000 people, with a bishop, twenty-one clergy and twenty schoolmasters (Rice 2008). However, by the 1st of July 1850, only 9,000 acres approximately had been sold and Godley's friends had to raise substantial sums of money to save the project.

The First Four ships began to arrive in December 1850 with the *Charlotte Jane* arriving on the morning of the 16th December. The *Randolph* arrived during the mid-afternoon that same day; the *Sir George Seymour* arrived the next day and the *Cressy* ten days later (Andersen 1949; Rice 2008; Rogers 2007; Scotter 1965). Altogether, there were 773 colonists consisting of more than 200 single men and women. These were the agricultural labourers, shepherds and domestic servants of Wakefield's plan. There were also carpenters, blacksmiths, barbers, plumbers, gardeners, bricklayers, printers, stonemasons and a butcher (Andersen 1949; Rice 2008). Many of these first arrivals did not remain long in Lyttelton or Christchurch but instead dispersed over the plains (Andersen 1949; Figure 14). Godley had soon realised that the plains were ideal for pastoral farming, and that the original plan for a close-knit agricultural settlement was unworkable. He lobbied successfully to ease the restrictions placed on pastoral land leased by the Canterbury Association, and in August 1851, an Act was passed enabling the Association to make its own regulations.

Early in 1852, more favourable leases were issued, with a sliding scale for rent that rose as the flocks increased (Rice 2008; Rogers 2007; Wilson 2012). Godley's alteration saved the Canterbury settlement from economic suicide and attracted experienced pastoralists from Australia who brought both sheep and capital to transform the settlement's economic prospects and shape the early growth of Christchurch (McAloon 2001; Rice 2008). The run-holders gave Canterbury its first and major export: wool. Christchurch's growth began as the market town for a pastoral economy. On the 30th of June 1852, the New Zealand Constitution Act was passed by the Westminster Parliament, which divided New Zealand into six

provinces, each with its own administration. The Canterbury Association ceased to exist as and from the 30th of September and Christchurch was a functioning town, even though it somewhat resembled a shantytown with wooden houses and dirt roads (Rice 2008; Figures 15 & 16).

Figure 14: Lyttelton 10th January 1851 Sketch by William Fox. (Rice 2008 pp. 17)

Figure 15: Early wooden Christchurch. (Canterbury Museum neg. 3119)

3.2: History of Victorian Christchurch

3.2.1: The Beginning of Christchurch City

By 1854 Christchurch had a population of 924 people living in 183 houses and was still confined within the boundaries of Barbadoes, St Asaph, Salisbury and Antigua Streets (Figure 17). However, Godley's town reserves began to be sold in 1855 and had all been snapped up by 1858. Christchurch's further growth depended on the province's (Canterbury) economic prospects and Christchurch became New Zealand's first city in 1856. Although it must have amused overseas visitors to be told that this scattered village of wooden shops and houses was a city, it was indeed, from 1856, by virtue of a royal charter (Wilson 2012; Figure 16). This was achieved simply because it became the seat of an Anglican bishop (Reverend Henry John Chitty Harper) who moved here on 23rd December 1856. The provincial period of Christchurch is difficult to imagine without Bishop Harper who consolidated the Anglican Church on a sound financial basis and succeeded in having the Cathedral constructed. Christchurch's biggest issue in the early 1850s was how to attain better access to Lyttelton and its port (Rice 2008; Wilson 2012).

Figure 16: V-Huts at Milford, Papanui Road, 1864. These huts were the usual form of accommodation for settlers when they first arrived in Christchurch/Lyttelton (Rogers 2007 pp.44)

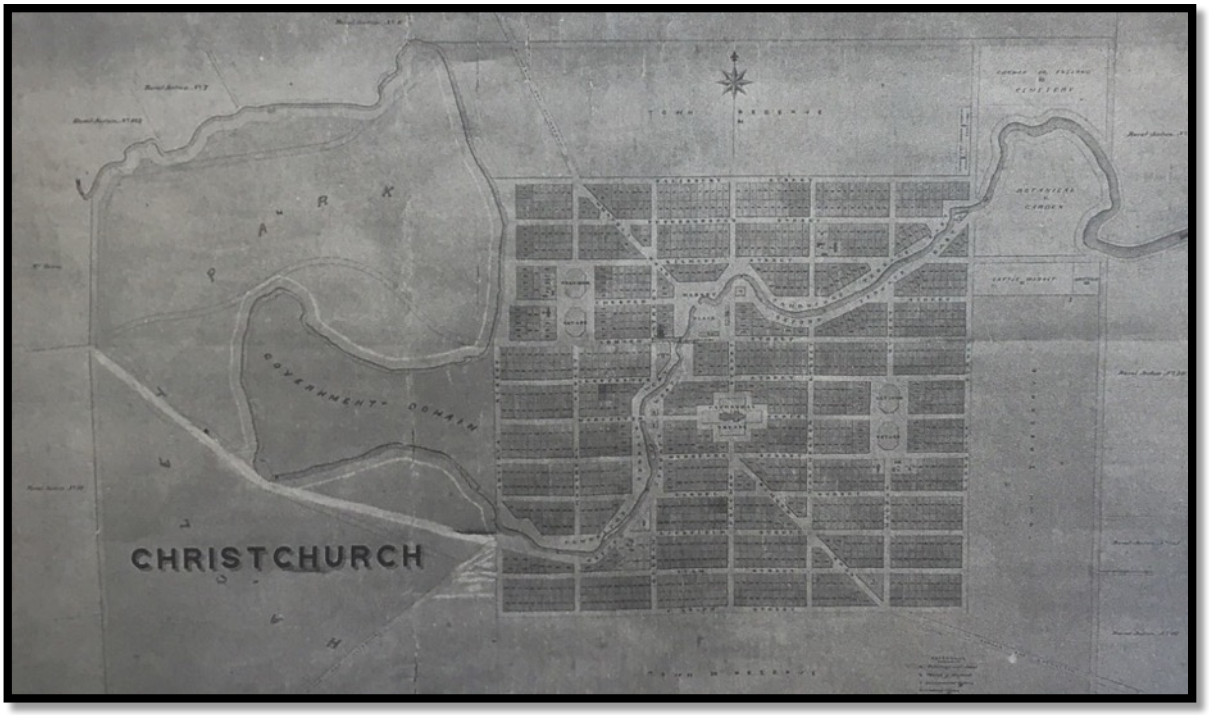


Figure 17: Edward Jollie's 1850 Plan of Central Christchurch (Rice 2008 pp. 23)

3.2.2: Transport in Victorian Christchurch

One of the main disadvantages of the Christchurch site was that the Port Hills separated the city from its port. All heavy goods had to risk the Sumner Bar before coming up the Avon or Heathcote Rivers, and many smaller boats overturned in the surf. In 1854, the Sumner Road that was started by Captain Thomas but still unfinished, commenced once again. The plan was to build a lower zig-zag road due to the obstacles of the rocky cliffs. It was the cheapest option and it was finished in 1857, however, the hazardous zig-zag deterred all except the bravest of carriers. The access between the city and its port remained acute (Rice 2008; Wilson 2012). One visible measure of Canterbury's prosperity in its first quarter century was the construction of the Lyttelton railway, completed in 1867, which provided vital access between the port and not only the city of Christchurch but also the Canterbury Plains. Earlier in the 1860s, New Zealand's first true railway had been built between Christchurch and Ferrymead. This was essential for Canterbury's economy and allowed for the construction of the rail tunnel (Burnard 2000; Scotter 1965; Wilson 2012; Figure 18).

Figure 18: The portal of the Lyttelton Rail Tunnel during construction in February 1867. (Rice 2008 pp. 30).

Figure 19: The bridge near Ferrymead (Wilson 2012 pp. 29).

The city matured remarkably in the 1880s and 1890s, with the emergence of many elegant commercial and public buildings, while spreading suburbs of wooden villas were linked to the central city by a steam and horse drawn tramway network. Other methods of transport in Christchurch city were either by bike or walking and it was not uncommon for Christchurch to be called the City of Cycles as this was the most popular way to get around (Rice 2008) "…in this flat city of straight streets the

bicycle was king" (Rogers 2007 98). Bridges were built during the last decades of the 19th century to make transportation easier. A bridge at Ferrymead, where the Heathcote River enters the estuary it shares with the Avon, was built close to where the ferry took the first settlers of 1850-1851 across the river on their initial journey from Lyttelton to Christchurch (Wilson 2012; Figure 19). The first importation of a motor-car to Christchurch was in November 1898, however cars continued to be a rare sight in the city as only the wealthy could afford them. Most of the traffic remained horse-drawn or human-powered until the 20th century when motor-cars became more affordable and popular (Wilson 2012).

3.2.3: Industry in Victorian Christchurch

Christchurch had a few major industries in the Victorian era and one of the first main exports was wool. Large runs were first leased to entrepreneurial sheep farmers however, these extensive sheep runs were eventually replaced by smaller family farms. On these family farms, running sheep, combined with cropping and some dairying, were the main source of income. Much of the material produced on these farms, especially wool and dairy products, were exported overseas as well as around New Zealand (Eldred-Grigg 1982; McAloon 2001; Wilson 2012). In the high country (the great ranges, river valleys and intermontane basins between the Plains and the Southern Alps) grazing sheep on large runs for wool remained the norm (Wilson 2012). Christchurch was an important social centre for these pastoral runholders as well as a source of supplies. The runholders of the Canterbury Plains saved the Canterbury settlement, including the city of Christchurch, in economic terms. Wool exports doubled in value to £90,134 by 1858 and more than doubled again to £189,498 in 1860 (Rice 2008).

Industrial development was slow prior to the 1860s (before the railways and the rail tunnel to Lyttelton). Apart from Anderson's forge, Christchurch in 1857 could boast only a windmill, two watermills, three breweries, a printing office and a tree nursery. Over the next decade however, small-scale workshops proliferated, making boots, wheels, barrels, rope, harnesses and all the other hand-made products of a typical mid-Victorian town. The recovery of the economy produced a

boom in the early 1870s (Pickles 2000; Rice 2008). Wool prices improved and the spread of small farming on the plains dramatically increased grain production (another important export for Christchurch in the Victorian era). The railway now gave farmers easy access to Lyttelton where clipper ships arrived in ever-increasing numbers to carry away Canterbury's wool and wheat (Bernard 2000). Wool exports surpassed the £1 million mark in 1875 (Rice 2008).

The provincial period came to an end in November 1876, with the abolition of the provincial councils and their replacement by numerous town boards, boroughs, road boards and harbour boards throughout New Zealand (Eldred-Grigg 1982; Rice 2008; Rogers 2007; Wilson 2012). Canterbury had been one of the most successful of the provinces, prospering from wool and wheat, and was spared from the disruption caused in the North Island by the Land Wars, or New Zealand wars, of the 1860s (Figure 20). By 1876, there were 12,815 people living in the central city of Christchurch and an estimated 10,000 in the surrounding suburbs (Rice 2008).

Figure 20: One of the Wheat Harvesting Stations near Ashburton (Rogers 2007 pp. 93)

Between 1877 and 1902, Christchurch endured a long economic depression, which was more severely felt in Canterbury than in the rest of New Zealand. It subsequently recovered, in the 1890s, more quickly and strongly than most other regions in New Zealand. Its prosperity was still closely tied to the exports of Canterbury's farmers and most of the city's major industries either served the farming sector or processed its products (Pickles 2000; Rice 2008). This was

disastrous as the prices for wool decreased so much that the value of grain exports, a secondary export, increased at times to almost half that of wool, and actually exceeded it in 1880 and 1883.

Wool remained the sheet anchor of Canterbury's overseas trade and the advent of refrigeration helped the province to overcome the depression most dramatically (Rice 2008). The Canterbury Frozen Meat Company was incorporated in 1882 and the Belfast Freezing Works began operation in 1883. The freezing works built near Christchurch, Ashburton and Timaru became some of the largest factories in Canterbury (Pickles 2000). Refrigerated shipping also opened overseas markets for butter and cheese and dairy factories were built in several locations (Rice 2008; Wilson 2012).

While the main source of Canterbury's prosperity lay in its exports of wool, wheat and meat, Christchurch developed a strong secondary-industries sector in this period. Even during the depths of the 1880s depression, new factories and businesses were still being established and as economic conditions improved in the late 1890s, some enjoyed spectacular success from exporting their products (Pickles 2000; Rice 2008). By 1896 the great majority of Christchurch's factory workers were employed in freezing works, tanneries, footwear, clothing and printing and publishing houses (Pickles 2000). For a few years near the turn of the century, Christchurch may have been the industrial capital of New Zealand, just ahead of Auckland in terms of both numbers of workers (if one includes Belfast and Kaiapoi) and value of production but this was to last for just a brief period (Rice 2008).

3.2.4: Politics in Victorian Christchurch

New Zealand had a split-level system of government during the provincial period (1853-76). The Governor and General Assembly comprised the central government, responsible to the Colonial Office in London for legislation, defence, native affairs, harbours, coinage and suchlike, while everything else was left to six provincial governments, each with an elected superintendent and council. Governor Grey saw fit to introduce the provincial level first, which gave Canterbury the opportunity to set up a miniature parliament rather than a glorified municipality (McAloon 2000; Rice 2008). According to Rice, only four superintendents held office in Canterbury during the provincial period (Fitzgerald, Moorhouse, Bealey, and Rolleston) and their names were subsequently given to the four wide avenues or 'belts' that enclosed the original town (2008). The Canterbury Provincial Council controlled Christchurch until a town board was set up in 1862 (which became the Christchurch City Council six years later). It initially comprised of 12 members but this later grew to 39 and a total of 166 men served at various times on the council. Their priorities included immigration, roads, bridges, and railways (Rice 2008).

James Edward Fitzgerald was Canterbury's first superintendent with his term ranging from 1853-57 (McAloon 2000; Rice 2008; Wilson 2012). He was successful in making early Christchurch one of the most wealthy provinces in New Zealand. With Godley, he saw that sheep farming was one of the more lucrative areas in which to make money quickly in Canterbury. His successor was William Sefton Moorhouse (1857-63 and 1866-68) whose outstanding achievement was his involvement in the construction of the rail tunnel linking Lyttelton to Christchurch. Samuel Bealey served one term from 1863, however Moorhouse returned for his fourth and last term. William Rolleston became Canterbury's last superintendent in May 1868 (Rice 2008). Although Moorhouse is remembered as the superintendent who achieved much, Rolleston was "the more admired in his day as the reliable administrator; honest, prudent and 'sound" (Rice 2008 35). As the provinces declined in the 1870s, Canterbury stood out as the model province and Rolleston as the model superintendent. In November 1876, the provincial councils were abolished and were replaced by numerous town boards, boroughs (Christchurch's

first borough was Sydenham (1877)), road boards and harbour boards (Rice 2008; Rogers 2007; Wilson 2012).

Figure 21: Portrait of Kate Sheppard (Rice 2008 pp. 53)

After 1876, Christchurch became a hot spot for the temperance movement. By 1884, the city had over twenty temperance societies with Sydenham being the location of their headquarters. Another important issue of the time was women's suffrage and again, Christchurch led New Zealand in this campaign.

In 1887, Kate Sheppard, a pioneering Christchurch feminist, took charge of the WCTU's (Women's Christian Temperance Union) suffrage campaign. New Zealand women won the right to vote in 1893 (McAloon 2000; Rice 2008; Figure 21). Christchurch was the cradle of trade unions and artisan radicalism in New Zealand during this period (McAloon 2000). More specifically, Sydenham, 'the model borough', led the way. In the early 1880s, a Working Men's Political Association was formed, critical of the 'polite' liberalism represented by newspapers such as the *Lyttelton Times* (established in 1851). Unemployment gave a sharp edge to their ideas and spurred the formation of unions such as the Canterbury Labour Union (1887) and the Canterbury Trades and Labour Council (1890) (McAloon 2000; Rice

2008). The general election of 1890 was the first one-man, one-vote election in New Zealand and was greatly influenced by the recent industrial troubles (McAloon 2000). The Trades Council endorsed the Liberal Party's candidates in Christchurch electorates, all of whom were successful. Christchurch thus became a Liberal stronghold for the next twenty years, in striking contrast to the conservatism of its social elite (Rice 2008).

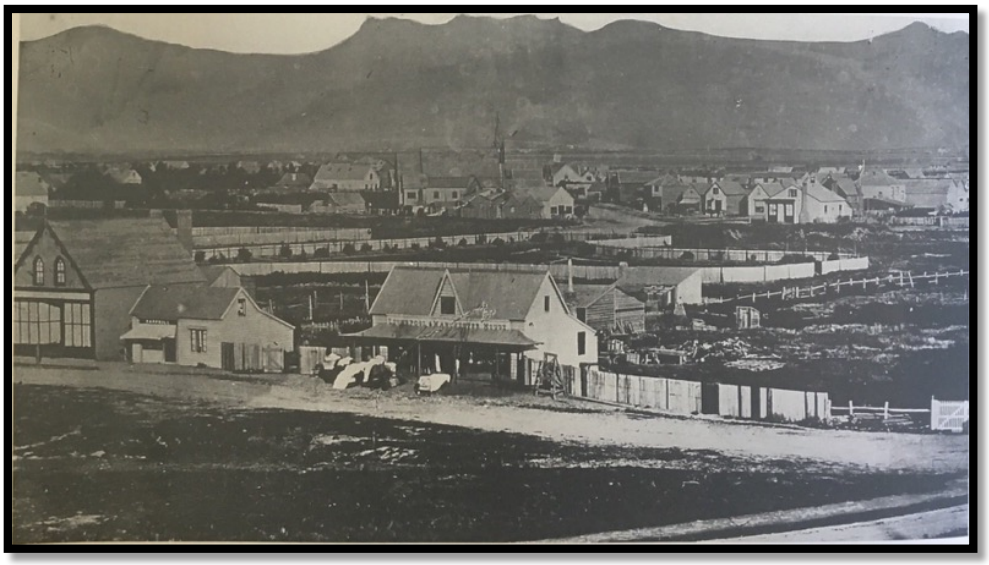


Figure 22: Part of Dr Barker's 1860 panorama of Christchurch, taken from the Tower of the Provincial Council Buildings (Rice 2008 pp.24)

Figure 23: Detail from Dr Barker's 1860 panorama of Christchurch. View towards the south-west, with Gloucester Street in the foreground. (Rice 2008 pp.29).

3.2.5: Social and Daily Life in Victorian Christchurch

Although it was a scattered village with wooden shops and houses, Christchurch became New Zealand's first city in 1856 (Figures 22 & 23). For the next 20 or so years, Christchurch was heavily influenced by industrial achievements that led to an improvement in living conditions. Several advancements made daily life much easier such as Christchurch's first street lighting (62 kerosene lamps in 1862), the city's first water well in February 1864 and Christchurch Hospital which opened in 1862. Waves of new immigrants (almost 20,000) arrived between 1871 and 1876. Over a third of the single women were Irish and in 1872, one ship brought several hundred Germans, Poles and Scandinavians (Eldred-Grigg 1982). The new immigrants of the seventies changed the composition of Christchurch's population decisively, ending its early, mainly English, Anglican character (Rice 2008). These new arrivals also found Christchurch a small town/city that was at long last beginning to shake off the raw 'Wild West' look of its early days with many new buildings emerging in brick or stone as well as wood (Rice 2008; Figures 24 & 25). The Canterbury Museum (1870) was the first significant public building in what became the city's cultural and educational precinct. This precinct also housed the permanent buildings of the Canterbury College (University). These were located opposite the Museum and shared a block with the new Christchurch Boys' High School (Eldred-Grigg 1998; Rice 2008). Stone churches were starting to appear with St John the Baptist's in Latimer Square and the Durham Street Methodist Church both having been completed in 1864. In the 1880s, the Cathedral was finally completed and Christchurch was known thereafter as New Zealand's Cathedral City.

Christchurch grew rapidly in the 1870s with many settlers moving into the surrounding suburbs (Andersen 1949; Rice 2008). However, it appears that the city was growing too rapidly for its own good, and as the provincial era ended, there were some serious public health problems. Epidemics of diphtheria and whooping cough were annual events from 1872 to 1875 and the typhoid epidemic of 1875-76 claimed the lives of 152 citizens. Christchurch had become notorious as New Zealand's 'fever capital' with much higher mortality rates from diphtheria, typhoid and scarlet fever than the other main centres (Eldred-Grigg 1982; Rice 2008;

Rogers 2007). This was because, in 1876, Christchurch was a remarkably smelly city and this was not just from the polluted Avon River into which the hospital and assorted breweries discharged their waste. The side channels of many inner-city streets were choked with 'slops', which in those days included the contents of chamber pots and kitchen waste. Wells for drinking water were frequently contaminated by nearby cesspits and unpaved streets were always littered with manure from horses, and from 1874, from other animals being driven to the saleyards in Deans Avenue (Eldred-Grigg 1982; Rice 2008). Unfortunately, this issue was not resolved before the provinces were abolished.

Figure 24: Shops in Victoria Street, between Kilmore and Peterborough Streets in the 1870s. (Rice 2008 pp. 42)

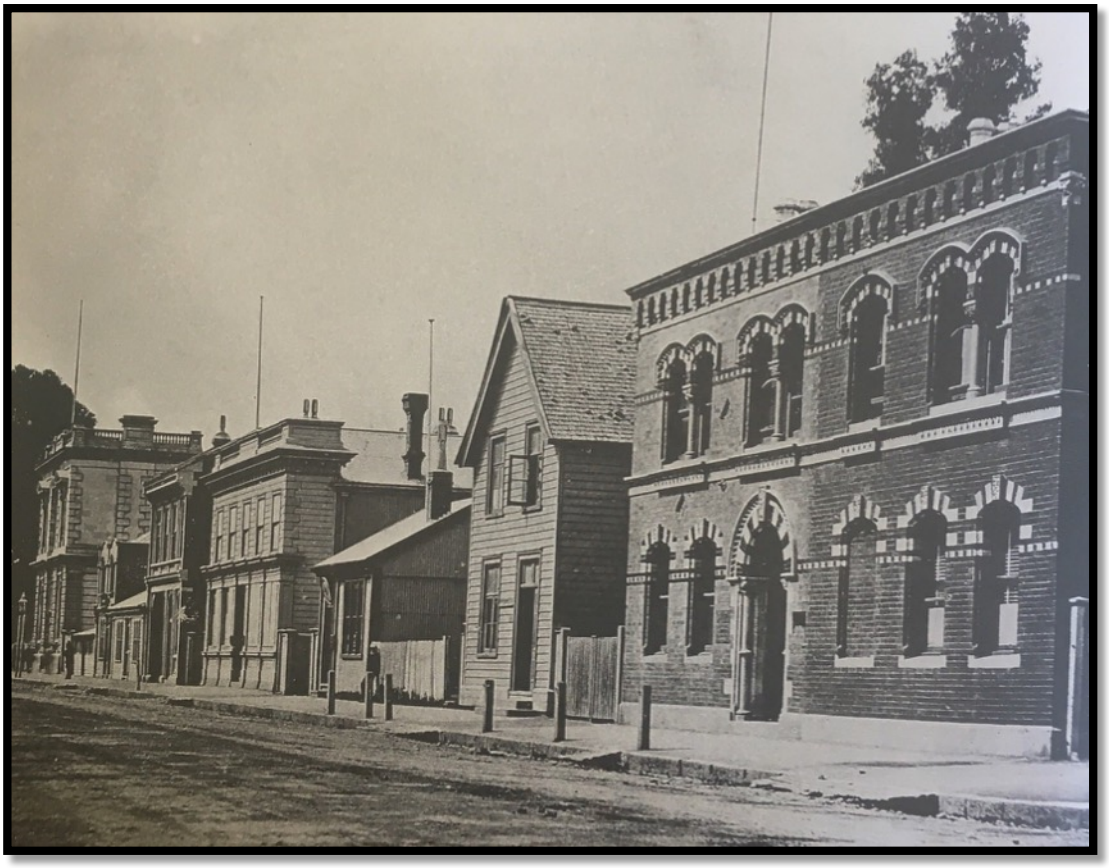


Figure 25: Hereford Street, looking east from Oxford Terrace, 1880. At the centre is the wooden Shand's building (Hereford Street warehouse site). (Rice 2008 pp. 50)

Figure 26: 'Cabstand Corner' in the early 1880s (later known as 'The Triangle). High Street on the left. Colombo Street on the right. (Rice 2008 pp. 46)

Victorian Christchurch resembled a far-flung fragment of Victorian England (Figures 26 & 27). A visitor to Christchurch from Norwich or Nottingham in the 1880s would have recognized familiar institutions. There were plenty of churches, a cathedral, a fine museum, botanic gardens, a university college, a mechanics' institute and a public library (Andersen 1949; Pickles 2000). Christchurch was also home to many voluntary associations, from lodges and friendly social societies to brass bands and a fire brigade. However, unemployment remained a serious social problem well into the 1890s and yet this was one of the great wheat-producing periods of Canterbury's history. Demand for wheat enabled small farmers to survive on the land even when the prices were low and it was not until the late 1890s when economic conditions improved (Wynn & Cant 2001; Rice 2008; Rogers 2007).

During the 1870s Christchurch had been New Zealand's unhealthiest city but in the 1880s it became the first New Zealand city to have a proper underground sewerage system (Eldred-Grigg 1982). Its construction began in 1879 and when it stopped in 1884, Christchurch had 36 miles of sewers but only 639 houses were connected. Dr Courtney Nedwill, the medical official at that time, was a tireless campaigner of sanitary reform and declared war on cesspits. There were at least a thousand cesspits in the central city in 1876, but by 1882, all had been closed and replaced by pan closets. Their elimination largely resolved the typhoid problem and the new sewers made the city a drier and healthier place. It was not, however, by modern standards, a salubrious town. An Englishwoman, 'Hopeful', disgusted by the flies she saw in the butchers' and fruiterers' shops, returned home to publish her adverse impressions under the title *Taken In* (1887). She complained of Christchurch's 'hot, stony, dusty, noisy streets and its filthy degraded-looking backyards (Hopeful 1887). Other visitors were alarmed by the 'typhoid-laden stink' from the side channels and thought there were too many hotels full of too many drunks (Eldred-Gigg 1982, 1984; Rice 2008). It was still, nonetheless, an exciting place to live, buzzing with new ideas, full of radicals, reformers and eccentrics (McAloon 2000; Rice 2008).

Sport was a dominating past-time with rugby and cricket becoming exceedingly popular (Ryan 2004, 2005). Christchurch also claims the first telephone exchange in New Zealand, opened by a group of businessmen in 1881, and the city's streets began to be festooned with an ever-increasing forest of poles and wires (Rice 2008; Rogers 2007). Electric lights made their first appearance on the Lyttelton wharf in 1882 and Ballantynes became the city's first store illuminated by electricity in 1891. The closing years of the 19th century and the beginning of the 20th century were without doubt the halcyon years of Christchurch's identity as an outpost of the British Empire with Queen Victoria's Diamond Jubilee (1897) being a celebration of this (Rice 2008).

In 1899, patriotic sentiment reached new heights with the outbreak of the Anglo-Boer War in South Africa and Canterbury's Volunteer movement was one of the strongest in New Zealand (Rice 2008; Wilson 2012). New Zealand's Third Contingent, of February 1900, was largely made up of Canterbury men. Canterbury celebrated its first jubilee in 1900 and was celebrated as a grand event culminating in processions, speeches and street decorations. Survivors of the First Four Ships attended this event although they were now few and elderly. The death of Queen Victoria in January 1901 brought about the end of the Victorian era in Christchurch (Eldred-Grigg 1982; Ogilvie 1996; Rice 2008; Scotter 1965; Wilson 2012).

Figure 27: View south from the Cathedral tower, 1882, looking down in Colombo Street. (Rice 2008 pp. 46).

3.2.6: Brief Outline of Post-Victorian Christchurch

The early years of the 20th century not only saw the arrival of the first motorcars and the first tractors but also the beginnings of a long connection between Canterbury and Antarctica. This occurred when several expeditions of Antarctic exploration sailed from Lyttelton with the first one occurring in 1901. A large crowd flocked to Lyttelton to meet the *Discovery* and Captain Robert Falcon Scott's first British Antarctic exploration (Rice 2008; Wilson 2012). Another event that was significant to the history of Colonial Canterbury was the use of electricity that became a normal part of Christchurch life in 1915 (Wilson 2012). This opened the door to the electric tramway system which remained an important part of the Christchurch transport system until after the end of the Second World War. It is today a popular tourist attraction Christchurch's CBD. By the outbreak of the First World War, Christchurch was a substantial commercial city (Wilson 2012).

After the First World War, Canterbury suffered a great deal of hardship. Many Canterbury farmers lost their livelihoods and the residents of the working-class areas of Christchurch, Timaru and Ashburton suffered deprivation while recovering from the losses of the War and the influenza epidemic of 1918. The most serious outbreak of industrial unrest in Christchurch's history occurred in 1932 when Christchurch's tramway workers went on strike (Wilson 2012). The advent of the Second World War finally restored prosperity to Canterbury with the demands of wartime production, however, this meant Canterbury families had to endure the painful experience of seeing loved ones off to war. During this time, there were several inventions and improvements that were important to Canterbury's history. These were the increasing number of cars and improvements to roads and bridges (Wilson 2012). Aviation began to play an important part in Canterbury life and planes were commonly seen in the Canterbury skies. 1945 was the year of unusual natural weather events but it was also the year that saw the troops come home. After the Second World War, farming continued to play a vital part in Canterbury's economy and has done so ever since. Queen Elizabeth became Queen of England in 1952 and this signaled the end of the Edwardian and Victorian eras - they had been the more significant periods in the Colonial history of Canterbury (Wilson 2012). The 21st century saw the most horrific and disastrous event that occurred in

Canterbury's history when the 2010 and 2011 earthquakes shook Christchurch to the core (Wilson 2012).

3.3: History of the Drinking Culture in New Zealand/Christchurch

3.3.1: History of Drinking in New Zealand

In 21st century New Zealand, alcohol is the most widely used drug with approximately $85 million being spent on it each week. It is also the oldest drug in the world. When the colonists from Europe and China began to settle, barrels of liquor inevitably came with them (Eldred-Grigg 1984). Alcohol in New Zealand can be dated from March 1773 when Cooks' men brewed up a concoction of beer in Fiordland using manuka leaves (Hargreaves et al 2000; Hutchins 2009). The colonial society of New Zealand made use of alcohol in numerous ways: as a food, as a drink and most notably as a drug taken either for health or pleasure (Eldred-Grigg 1984). In the 1830s, the Bay of Islands (Kororareka) had a notorious reputation for wild drinking and severe drunkenness with the help of New Zealand's first brewery opened by Londoner, Joel Samuel Polack, in 1835 and Kororereka's numerous grog shops that had a bounty of alcohol. Some called it the "Hellhole of the Pacific" (Hutchins 2009 12). Some issues arose around the amount of alcohol the colonists (including whalers, gold-miners and early farmers/shepherds as well as pilgrims) were consuming due to it forming a major part of their diet with some choosing alcohol over food. This resulted in very heavy drinkers becoming dangerously sick or dying as alcohol has little nutritional value (Eldred-Grigg 1984). Sickness or death did not deter many from drinking alcohol partly because it was seen as a necessary thirst quencher.

At this time, there were few readily available safe drinks. Fresh water was a common occurrence in New Zealand but pollution quickly followed settlement. By 1862, the Dunedin waterways were so badly contaminated by human deposits that doctors warned citizens not to drink the extremely dangerous liquid (Eldred-Grigg 1984). Milk was available but it was dangerous due to the bacteria it contained and cordials were more expensive than liquor. Alcohol became the preferred drink of the time and the pubs/hotels/'grog' shops where it was sold were a nice, warm getaway from the wooden shacks in which many people lived. Alcohol made the living conditions of colonial New Zealand bearable for many reasons (Eldred-Grigg 1984; Hutchins 2009; Rice 2008). It also would have helped to blot out the psychic

pain of social isolation (Fairburn 1989). Prior to 1840, beer was the least popular type of alcohol because initially it had to be carried inland. Beer was too bulky and did not travel well whereas the alcohol content of port/sherry and spirits relative to volume was higher. Local breweries emerged in the 1840s with the first brewery opening in 1835 in Kororareka (Donaldson 2012; Hutchins 2009). However, it was not until the 1860s that they became extremely popular (Donaldson 2012; McLauchlan 1994). During this time, the number of breweries increased from 51 to 91 and numerous local breweries made better quality beer more accessible. Beer drinking increased and this proved unfortunate in many ways (Eldred-Grigg 1984).

Figure 28: Drawing showing part of the Christchurch Boxing Day riot of 1879 (Eldred-Grigg 1982 pp. 89)

From the 1840s, many were critical of liquor. The authorities began trying to control the importation of alcohol but this made smuggling more common and intemperance inevitable as a bounty of beer, malt liquors, wine, cider, brandy, rum and whiskey was being sold in many pubs and grog shops (Hutchins 2009). Over the next few years, the government tried to control the amount of alcohol being brought into and produced in New Zealand. They eventually became aware that the imposition of whiskey tax would be beneficial for their coffers as whiskey was one of the more popular drinks at the time (Eldred-Grigg 1984; Hutchins 2009).

Therefore, the Distillation Prohibition Ordinance Amendment Act of 1865 and the Distillation Act of 1866 were passed and cleared the way for legal distillation under licence (Hutchins 2009). The Distillation Act of 1868 finally sealed the business of commercial advantage of locally made spirits over imports, while also coming down hard on illegal stills (Hutchins 2009).

However, this wasn't enough for some who were still unhappy with the amount of alcohol available. These were often religious dissenters who saw alcohol as undermining moral behaviour. Others made the reasonable point that its effects led to violence and distress, especially towards women (Figure 28). "Vomiting drunks were conspicuous everywhere and people knew when a group was 'liquored up' things often end in violence" (Eldred-Grigg 1984 61). Groups such as temperance lodges and bands of hope campaigned for voluntary abstinence, and with the formation of the Women's Christian Temperance Union in 1885 and the New Zealand Alliance in 1886, the main hope became total legal prohibition (Bollinger 1967; Eldred Grigg 1984; Hutchins 2009).

Prohibition became a major, highly divisive moral crusade bolstered by pamphlets, songs, processions, lectures and endless petitions (Eldred-Grigg 1984: Hutchins 2009). Some results did eventuate from the prohibition movement including the Licensing Act of 1881, the abolishment of Sunday drinking (1881), the raising of the minimum drinking age to 18 (1904) and then to 21 (1910) and the change of the closing times of licensed premises from midnight to 11pm (1893) and then to 10pm and eventually 6pm in 1917 (Bollinger 1967; Eldred-Grigg 1984; Fairburn 1989; Hutchins 2009). In December 1919, New Zealand narrowly avoided becoming completely dry by 3,263 votes. These legislative restrictions reduced the quantity, availability and visibility of drinking. The number of licensed houses fell from one for every 328 people in 1880 to one for 833 in 1910 and the consumption of spirits and wine fell by approximately 50% between 1881 and 1919 (although the consumption of beer did increase slightly) (Eldred-Grigg 1984). To this day, the consumption of large amounts of alcohol has continued coupled with occasional outbreaks of drunken hooliganism. However, with the help of the prohibition legislation and certain modern laws (introduced after the 1960s), these outbreaks

have decreased and drinking alcohol appears to be more civilised than it was previously.

3.3.2: History of Drinking in Christchurch

As with other planned settlements in New Zealand, Canterbury's drinking culture began when the first settlers arrived, (whalers, sealers, first farmers etc.), bringing alcohol with them. This is evident from archaeological assemblages and certain museum exhibits such as the Campbelltown & Islay whiskey bottle (EC172.471; Figure 29) that John Deans brought with him on the *Minerva.* This bottle is now held at the Canterbury Museum. Christchurch, in the 1850s and 1860s, was a frontier in more than just appearance. Apart from petty theft, crime was not a serious problem but the clergy denounced drunkenness and prostitution as major social evils (Eldred-Grigg 1984; Rice 2008). Christchurch had numerous grog shops and no fewer than 28 known brothels in 1869 (Rice 2008). In 1857, Christchurch already had three functioning breweries (one being the Ward Brewery that eventually became a Lion Brewery) and by 1878 there were forty-one hotels and six breweries (Rice 2008). In the 1880s, Christchurch had ten breweries and they competed strongly, often buying hotels or tying privately owned pubs into exclusive purchasing arrangements (McLauchlan 1994). Visitors to Christchurch were horrified at the number of licensed premises and at the level of drinking that was occurring leading to a major social problem in which women and children mostly suffered (Eldred-Grigg 1984; Rice 2008; Figure 28). Christchurch, therefore, became the main centre for the temperance movement in the 1880s and 1890s.

Several small, church-based abstinence societies had existed from the 1860s but by 1884 the city had over 20 temperance societies. They found strength in unity and formed the Women's Christian Temperance Union (WCTU) in 1885 (Rice 2008). The temperance movement had its headquarters in Sydenham, and two dynamic leaders, the Reverend L. M. Isitt and T. E. (Tommy) Taylor, established the Sydenham Prohibition League in 1889 (Bollinger 1967; Rice 2008). From 1890, their journal *The Prohibitionist* circulated throughout New Zealand and was ultimately adopted by the Alliance as their official organ (Bollinger 1967). Kate

Sheppard was a main supporter of the temperance movement and took charge of the WCTU in 1887. She wanted to improve the treatment of women where drunkenness was a major factor as domestic violence was more common if alcohol was involved. This led to her successful campaign for women's suffrage (Bollinger 1967; McAloon 2000; Rice 2008) Drunkenness decreased after the temperance movement of the Victorian Era but it persisted on a lesser scale throughout the 20th century (Hutchins 2009; McLauchlan 1994). Drinking alcohol is a popular past-time to this day with beer and wine extremely popular as casually consumed beverages and there are still occasional outbreaks of drunken disturbances (Donaldson 2012; Hutchins 2009; McLauchlan 1994). With numerous new breweries, distilleries, wineries and bars opening in the area, as well as binge drinking amongst the young, it doesn't appear that this will change in the near future.

Figure 29: Whiskey Bottle brought over from Scotland by John Deans in 1853. (EC172.471 Canterbury Museum)

Chapter 4: 15 Lawson Street

4.1: 15 Lawson Street, Christchurch

The site at 15 Lawson Street is located in the suburb of Sydenham in Christchurch (Figure 30). The building that occupied this site was demolished after the earthquake of the 22nd of February 2011. On the 24th of June 2013, the New Zealand Historic Places Trust (now Heritage New Zealand Pouhere Taonga) issued an emergency authority (2013/869eq) under section 11(1) of the Canterbury Earthquake Order. This authority was issued to allow the contractor to complete the demolition of the building and remove the underlying foundations. An authority was required as the removal of the foundations had the potential to affect subsurface archaeological remains associated with the pre-1900 occupation of the site (Carter et al 2013). The removal of the foundations, the excavation and the initial artefact analysis were all performed by Underground Overground Archaeology Ltd. Underground Overground Archaeology Ltd's investigations found that 15 Lawson Street operated as a trader/dealer business from the latter part of the 19th century until the early 20th century (Carter et al 2013).

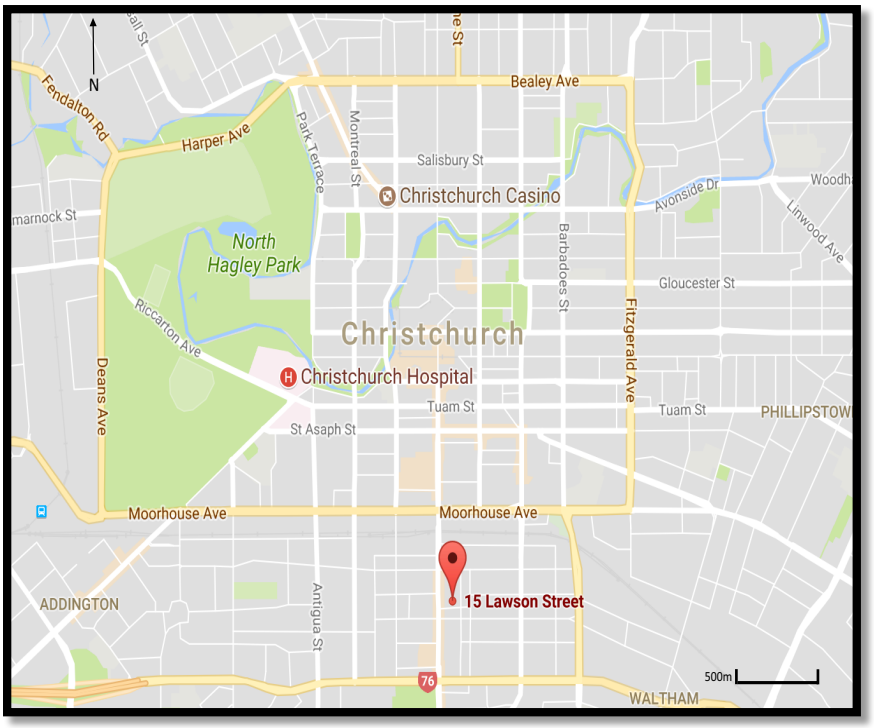


Figure 30: Map showing location of 15 Lawson Street, Christchurch (2017 Google Maps)

4.2: Site History

The suburb of Sydenham was originally rural land on the outskirts of Christchurch. That part which was to be known later as Sydenham lay in the wilderness between the South Belt (now Moorhouse Avenue) and the Port Hills, and as such could be bought as rural sections of fifty-acre blocks for the price of £3 an acre (New Zealand Federation of University Women 1977). The biggest block of 300 acres, Rural Section 79, (which included the site of 15 Lawson Street), was surrounded by the South Belt, Going's Road (now Brougham Street), Hayter's Road (Waltham Road) and Windmill Road (Antiqua Street) (New Zealand Federation of University Women 1977). It was selected by Henry Gordon of Nottingham who sold it to Edward Gibbon Wakefield in 1851 while he still resided in England (Fairburn 2012). Wakefield voyaged to Christchurch in 1853 but settled in Wellington a month later. Perhaps as a result of his settlement in Wellington, Rural Section 79 was leased in 1855 to Lindsell and O'Neill (Carter et al 2013; LINZ c.1853 RS 79). These are recorded as separate leases so it is likely each man leased a part of the section, possibly for animal grazing. In 1856 the section was sold to Edward Jerningham Wakefield, Edward Gibbon's son.

In 1858 Edward Jerningham Wakefield began to subdivide and sell off portions of the original rural section (New Zealand Federation of University Women 1977). A long, narrow strip of land boarded by Colombo, Brougham, Hawdon and Carlyle Streets was purchased in 1872 by Hugh Percy Murray-Aynsley, a prominent Christchurch merchant (Carter et al 2013; LINZ 1872). Murray-Aynsley was a partner in the firm Miles & Co before becoming the Chairman of Directors of the New Zealand Shipping Company. He also owned a sheep run at Mount Hutt and was a member of the Provincial Council and National General Assembly (Carter et al 2013). In 1876 Murray-Aynsley subdivided this property into 77 separate lots arranged around Buchan Street (running north-south between Carlyle and Brougham Streets) and Byron, Lawson, Penbury and Harold Streets (running west-east between Colombo and Hawdon Streets) (Carter et al 2013; LINZ 1879). Lot 52 was located on the northern side of Lawson Street and was eventually the location of 15 Lawson Street (Carter et al 2013; Figure 31). Lawson Street was originally

named Elizabeth Street but was renamed Lawson Street in 1909 after the Australian poet and writer Henry Lawson (Chch City Libraries 2016).

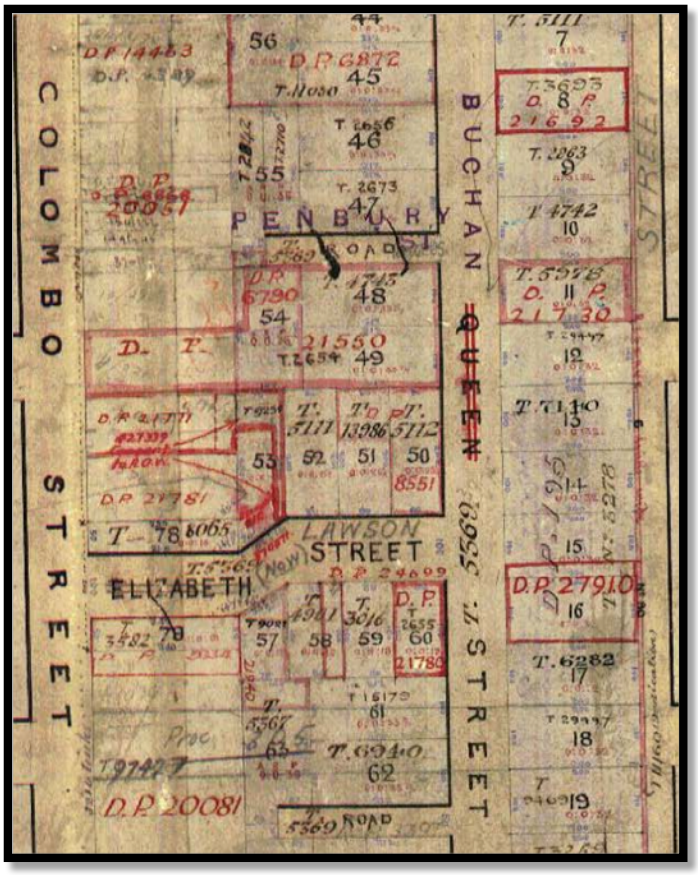


Figure 31: Detail of DP 75 showing Lot 52 RS 79 situated on the north side of Elizabeth Street (Lawson St) (Carter et al 2013)

In 1877, Thomas Townsend, a Lincoln farmer, purchased Lots 7 and 52 from Murray-Aynsley (Carter et al 2013; LINZ 1877). It is likely that Townsend purchased these properties as investments as the few mentions of him in newspapers and other primary sources indicate that he remained a resident in Lincoln (*Star* 18/10/1879; *Press* 19/12/1879). The next purchaser of the property was Harriet Snell in 1886 (Carter et el 2013). Newspaper advertisements suggest that the Snells were residents on Elizabeth Street after 1889 when Harriet advertised for an underclothing machinist to work at her grocery store (*Star* 26/2/1889). By 1891 John Snell (Harriet's husband) was advertising for a variety of metals and bric-a-brac from his residence in Elizabeth Street (*Star* 11/9/1891). The grocery store appears to have been turned into a second-hand and scrap metal dealership. The following year John advertised for bottles 'of all kinds; about 20,000 dozen in stock; small ale and porter bottles at threepence per dozen….' (*Star*

22/11/1892). This was the start of the bottle exchange that is the main focus of this thesis (*Star* 21/05/1893*;* Figure 32)


BOTTLES! Bottles!! All kinds for sale cheap
J. Snell, Bottle Merchant, Elizabeth street
Sydenham. 8304

Figure 32: Advertisement for Bottles for Sale by J. Snell (Star 21/05/1893)

In 1896, a change in the couple's business organisation is apparent in various newspaper advertisements. John Snell, now advertising for oil drums, shifted his business premises to Colombo Street (*Star* 11/7/1896*).* The following year Harriet established a dressmaking school in Elizabeth Street (*Star* 27/9/1897; Figure 33). In 1899, John's business was described as a 'waste product and bottle merchant' (*Star* 22/2/1899) and then as the more professional sounding 'Canterbury Bottle Exchange' (*Star* 29/6/1901; Figure 34).

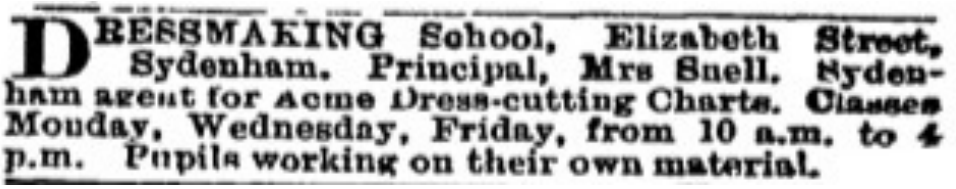

DRESSMAKING School, Elizabeth Street, Sydenham. Principal, Mrs Snell. Sydenham agent for Acme Dress-cutting Charts. Classes Monday, Wednesday, Friday, from 10 a.m. to 4 p.m. Pupils working on their own material.

Figure 33: Advertisement for Harriet Snell's dressmaking school (Star 27/11/1897).

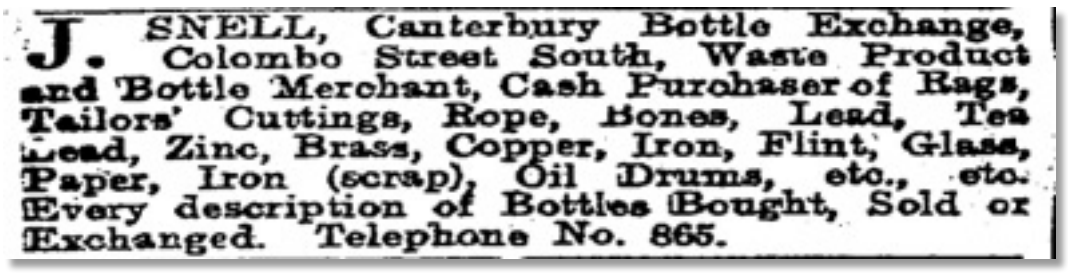

J. SNELL, Canterbury Bottle Exchange, Colombo Street South, Waste Product and Bottle Merchant, Cash Purchaser of Rags, Tailors' Cuttings, Rope, Bones, Lead, Tea Lead, Zinc, Brass, Copper, Iron, Flint, Glass, Paper, Iron (scrap), Oil Drums, etc., etc. Every description of Bottles Bought, Sold or Exchanged. Telephone No. 865.

Figure 34: Advertisement for John Snell's 'Canterbury Bottle Exchange' (Star 29/6/1901).

In 1904 the Snells sold the Elizabeth Street property to a group of Christchurch businessmen. It appears that these gentlemen represented the Sydenham Football Club committee because the Football Club hall was erected on the property in the same year as the purchase (*Star* 22/3/1904; New Zealand Federation of University Women 1977). Notably, in 1904, in the same newspaper article as the announcement of the new Football Club hall, J. Snell was listed as one of several club

officers. The Football club was used as a venue for various community events, and during the influenza epidemic of 1918, was used as a treatment and supplies depot (*Press* 21/11/1918). Sydenham was one of the worst affected areas of Christchurch during this epidemic (Carter et al 2013). The Football Club continued to occupy 15 Lawson Street until 1973 when the property was purchased by Mana Transport Ltd, Wellington (Carter et al 2013). After the 1950s, Sydenham became a more industrial and commercial part of Christchurch rather than a residential one. Unfortunately, Sydenham was also one of the more badly damaged areas in Christchurch after the earthquake of the 22nd of February 2011.

4.3: Archaeological Investigation

4.3.1: Excavation

During the 29th, 30th and 31st of August 2013, the foundations of the building at 15 Lawson Street were removed using a mechanical excavator, with archaeologists from Underground Overground Ltd monitoring the work (Matthew Carter, Luke Tremlett and Kirsa Webb). The foundations consisted of a concrete perimeter footing 350mm wide and 500mm deep. This concrete contained a river shingle aggregate. During the removal of the foundations, the excavation of the site occurred. Overall, six different features were identified and excavated during earthworks (Carter et al 2013; Figure 35). These features included:

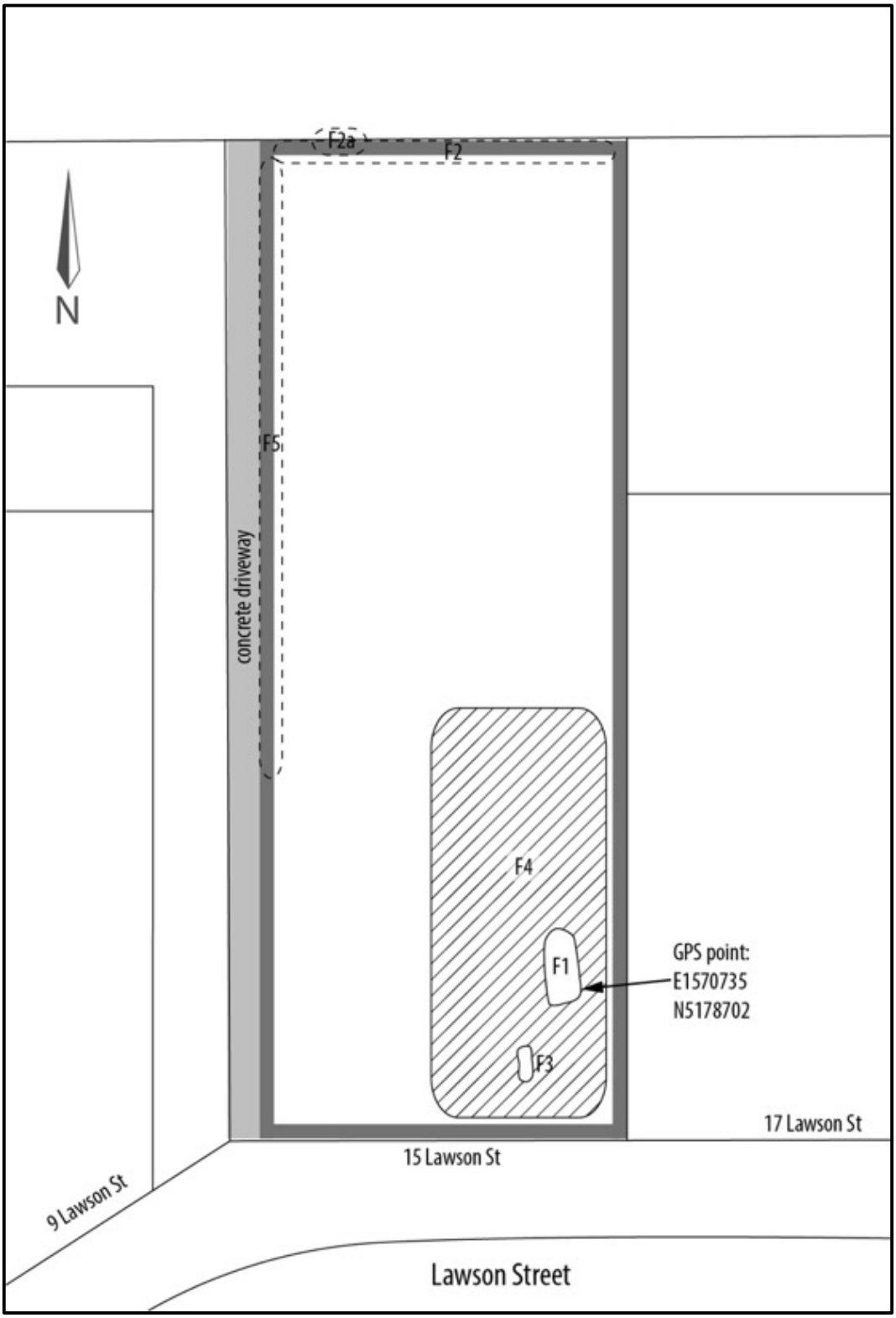


Figure 35: Sketch Plan of 15 Lawson Street showing the Location of Archaeological Features (Carter et al 2013).

Feature 1:

Feature 1 was a trench that measured 3300mm long by 700m wide by 300mm deep that had been filled with domestic rubbish (glass bottles, various ceramic material etc). This feature produced the greatest number of artefacts and it was the largest of the identified features (Carter et al 2013).

Feature 2:

Feature 2 consisted of a disturbed foundation trench fill. It was located within the foundation trench at the north end of the site. The feature contained a small quantity of domestic artefacts loosely scattered throughout the fill. The feature was disturbed by the removal of the foundations. It is likely that the artefacts will remain in situ to the north of the feature (Carter et al 2013).

Feature 2a:

Feature 2a consisted of a domestic rubbish pit at the northwest corner of the site. The pit produced a higher concentration of artefacts than Feature 2 and was contained by a piece of sheet metal deposited on the top. The pit measured 750mm across and was 300mm deep. The pit extended north underneath the adjacent car park and was left in situ as this area was not excavated as part of removal of the foundations (Carter et al 2013).

Feature 3:

Feature 3 consisted of a small domestic rubbish pit located at the southeast corner of the site, close to Feature 1. The feature was roughly kidney shaped and measured 800mm by 300mm. Once excavated the pit extended 200mm below the ground surface (Carter et al 2013).

Feature 4:

Feature 4 consisted of a heavily disturbed surface layer of artefacts. The feature was most likely disturbed by the demolition of the building and removal of the foundations. The feature extended across the southeast range of the site (Carter et al 2013).

Feature 5:

Feature 5 was similar to Feature 2 and consisted of a disturbed foundation trench fill that was exposed by the removal of the foundations along the west side of the site. The artefacts within the fill were concentrated towards the north end of the trench. It is likely the artefacts will remain in situ in the west of the feature (Carter et al 2013)

In conjunction with the removal of foundations and excavation, Underground Overground Archaeology Ltd also carried out the initial artefact analysis.

4.3.2: Underground Overground Archaeology Ltd Artefact Analysis

A total of 1476 artefacts were recovered during the excavation, with a total of 1021 individual items initially sorted according to material class (ceramic, faunal, glass, metal and miscellaneous) before being identified as individual types and forms. Sorting and analysis of each material class was undertaken according to attributes specific to each class. It appears that Underground Overground Archaeology Ltd did not place specific emphasis on any of the attributes (Carter et al 2013). The individual sections that they used during the analysis are stated below:

Ceramic Artefacts (Table 4.1)

A number of references were consulted during the analysis of the ceramic assemblage. Brooks (2005) was the principle reference used for the analysis of material ware, form and decorative technique. Samford (1997) was consulted in relation to decorative patterns and colours and internet resources such as The Potteries website were also utilised. Maker's marks were identified using Godden

(1991) and The Potteries website. These resources contribute to the internal database maintained by Underground Overground Archaeology Ltd which records both identified ceramic maker's marks and patterns recovered from previous archaeological sites in Canterbury (Carter et al 2013).

Table 4.1: Attributes recorded in Ceramic Analysis

Bag ID	**Material**	**Quantity**	**Decoration**	**General information**
Site	Body type	NISP	Technique	Notes
Code	Glaze	MNI	Colour	References
Box number	Ware		Pattern name/motif	Photo number
Bag number	Function		Maker's mark	
Provenance	Form			
	Portion			

Faunal Material (Table 4.2)

Methods of analysing the faunal material drew on those outlined in Watson (2000). The faunal material was identified as belonging to the taxonomic category and, where possible, mammal and bird bones were identified as species. Underground Overground Archaeology holds a reference collection of European mammal bones and the bird bone reference collection at the Canterbury Museum was used to identify bird bones (Carter et al 2013).

:

Table 4.2: Attributes recorded in Faunal Analysis

Bag ID	Description	Detailed analysis	General information
Site	Species	Taphonomy	Notes
Code	Element		Photo number
Box number	Side		
Bag number	Portion		
Provenance			

Glass Artefacts (Table 4.3)

Glass vessels were sorted by provenance and analysed according to the process outlined in Smith (2004). This included recording glass colour, finish, base type and any marks present. Further information concerning the bottle and product manufacturers identified by marks was supplied where possible. Internet research provided the majority of this information but Donaldson et al. (1990) and Lindsey (2017) also proved useful (Carter et al 2013).

Table 4.3: Attributes recorded in Glass Analysis

Bag ID	General description	Quantity	Manufacture	Identification details
Site	Colour	NISP	Type	Embossing
Code	Portion	MNV	Marks	Notes
Box number	Class			Reference
Bag number	Common name			Photo ID
Provenance	Details			

Metal Artefacts (Table 4.4)

Table 4.4: Attributes recorded in Metal Analysis

Bag ID	Description	Quantity	Identification details
Site	Material	Measurements	Notes
Code	Form	NISP	Reference
Box number	Details	MNI	Photo ID
Bag number	Portion		
Provenance			

Miscellaneous Artefacts (Table 4.5)

Table 4.5: Attributes recorded in Miscellaneous Analysis

Bag ID	Description	Quantity	Information
Site	Material	Measurement	Notes
Code	Artefact	NISP	ID
Box number	Portion	MNI	
Bag number	Description		
Provenance			

Items were quantified in keeping with standard archaeological protocols, recording both NISPs (number of identified specimens) and MNV/E/Is (minimum number of vessels/elements/items) for individual artefacts. Only the metal items were measured and it appears none of the artefacts were weighed. The results were first split into provenance (F1, F2, F2a, F3, F4 or F5) and were later divided into material class and then functional type (Carter et al 2013). These results are summarised in Table 4.6 below and shown in full in Appendix 1.

Table 4.6: Overall Summary Table

MATERIAL	ARTEFACT	NISP	MN
CERAMIC	Tableware	80	17
	Tea-ware	14	5
	Beverage	7	4
	Storage	7	2
	Household	63	39
	Utilitarian	1	1
	Hollow-ware	34	3
FAUNAL	Cockle	1	1
MATERIAL	Cow	15	3
	Sheep	29	18
GLASS	Bottle	950	699
	Stopper	50	49
	Window	22	5
	Glass		
	Tableware	9	8
METAL	Spike	2	2
	Nail	3	3
	Bowl	1	1
	Hook	1	1
	Belt Buckle	1	1
	Horseshoe	2	2
	Strip	1	1
	Mesh	3	2
	Other	10	1
OTHER	Shoe	3	2
	Cork	136	136
	Clothing	3	3
	Slate	7	2
	Brick	1	1
	Wood	3	3
	Drainpipe	3	2
	Other	14	4
TOTAL		**1476**	**1021**

4.4: Summary of Site Context

Due to the archaeological evidence and historical documents that support the context of the site, 15 Lawson Street has been identified as a 19th century bottle exchange. Newspaper articles and advertisements as well as land records inform us that the site was occupied by John Snell who appears to have been a trader/dealer of bottles and other materials. According to the *Star* 29/6/1901, he was involved in, or was the owner of, the Canterbury bottle exchange, which gives us sufficient evidence to assume the site was sometimes the location of a bottle exchange (he did move the business to a site on Colombo Street while his wife worked from Lawson Street). Archaeological evidence also supports the context of the site due to the large amount of glass material that was found there. The overall NISP of glass material was 1031 with 761 individual vessels representing a major portion of the 1476 total NISP of artefacts (1021 individuals) recovered from 15 Lawson Street. This, along with the amount of use wear on the bottles, suggests that glass bottles were the main trading item leading to the conclusion that the site was indeed a bottle exchange.

New Zealand did not have glass bottle manufacturers until the 1920s (Petchey & Innanchai 2012) and therefore most of the bottles from the 19th century and early 20th century were imported from overseas and then reused numerous times. According to Woff, a single bottle could be reused 20 to 30 times (2014). Brewers, snuff manufacturers, druggists and other entrepreneurs who needed bottles to market their products would advertise by various methods and would pay cash or exchange other goods for either old or new bottles (Busch 1987). For example: "Bottles! Bottles! Bottles! Wanted to purchase… Scarlett and Co, Bath Street, Colombo Street South" (*Star* 10/05/1882), "Wanted, quantity of Claret Bottles, pints and quarts. T.J Maling and Co, Hereford Street (*Star* 11/01/1882) and "Bottles, Bottles - Wanted, thousands dozen champagne quarts; highest price paid. Apply, Ballin Bros" *(Star* 26/05/1896).

Bottle merchants such as John Snell would advertise to purchase bottles and other commodities and after they had cleaned them, would sell them back to breweries

(such as the Ward Brewery), druggists and alcohol merchants (McLauchlan 1994; *Star* 22/11/1892; 22/2/1899; *Press* 8/04/1903*)*. The system went around in a circle and, it appears that the Canterbury Bottle Exchange/John Snell was one of the limited number of businesses that sold bottles as well as purchased them in Christchurch- "Bottles, Bottles, Bottles of every description for sale, cheap. J. Snell, Elizabeth Street, Sydenham" (*Star* 29/06/1894) "Canterbury Bottle Exchange are buyers of metal of all kinds, Bottles, Casks, Sacks, Horse Hair… Prices on Application. 47 Colombo Street South, Christchurch" (*Press* 8/04/1903). Some big breweries would ask for their own bottles to be returned in order to save money and therefore they had little requirement for a bottle exchange (Busch 1987). Nonetheless, bottle exchanges were essential to the smaller breweries and other merchants during the 19th century and early 20th century.

Chapter 5: Methodology and Comparative Assemblages

This chapter will outline the pilot study that led to the development of a scale that measures use wear on glass bottles as well as the methods used to produce the said scale. It will also explain how it was put into action in conjunction with the artefact analysis that was used while measuring the glass bottles. Lastly, the chapter will also give a brief background on each of the four comparison assemblages.

5.1: Pilot Study

Is it possible to measure use wear on glass bottles? Throughout the 19th century, these artefacts were imported into New Zealand as local manufacturing did not begin until 1922 (Petchey & Innanchai 2012; Tasker 1989). This made bottles valuable, comparatively expensive and encouraged their reuse. "Once in New Zealand, bottles could be… recycled many times by local businesses (or separate homes), and not necessarily with the same contents" (Petchey & Innanchai 2012). Reuse has implications for the interpretation of bottle glass assemblages, but to date there has been no systematic way of documenting this and determining whether there is variation in reuse between different common bottle types and between assemblages from different sites and environments. This is why a scale for measuring the extent of use wear on both alcohol bottles and non-alcohol glass bottles has been developed and built on the presumption that continued use of a bottle will leave physical evidence in the form of scratches, pitting and wear, particularly on the base.

It initially proved difficult to decide which direction this study should take and therefore a sample of 30 bottles was randomly selected from the primary study assemblage (15 Lawson Street: Bottle Exchange). These bottles were examined to determine what were the most common forms of wear. Scratches, pitting and abrasions were determined to be the most common types and these were usually located on the base of the bottles. This is not the only time evidence of use has been recorded. Karskens (1999) and Woff (2014) both noted that markings such as

scratches and abrasions on the base tend to be signs of heavy reuse but did not study these markings in any detail. While examining the use wear, the occurrence of this evidence was highly variable, indicating that differences in the degree of wear should be able to be quantified. Examples of wear were recorded both photographically and with drawings to assess the potential methods for illustrating use wear and finally the idea of developing a scale of use wear was made.

5.2: Development of the Use Wear Scale

5.2.1: Designing a Wear Scale

As most of the wear was on the bases of the bottles, a meaningful use wear scale should focus on this portion. Bottle base morphology is highly variable with differences in presence and form of a kick-up, and shape of the heel. A use wear recording method needed to be able to accommodate this. Another issue is that many 19th century bottles sit unevenly due to flaws in manufacturing and this can produce uneven wear on the base. Also, many archaeological specimens are broken so that only part of the base is available for observing wear. A use wear recording method needed to be able to account for these circumstances.

After studying the different levels of wear on the sample of 30 bases, an eight-step scale was designed to measure the intensity of use wear, (from 0 indicating no wear to 7 indicating extremely intensive wear) (Figure 36).

Scale Number	Drawing	Description
0		No Wear
1		Scratches Only
2		Faint/Narrow Patches
3		Medium Patches
4		Distinct/Wide Patches
5		Continuous Faint/Narrow Line of Wearing
6		Continuous Medium Line of Wearing
7		Continuous Distinct/Wide Line of Wearing

Figure 36: Scale showing the different levels of intensity of wear.

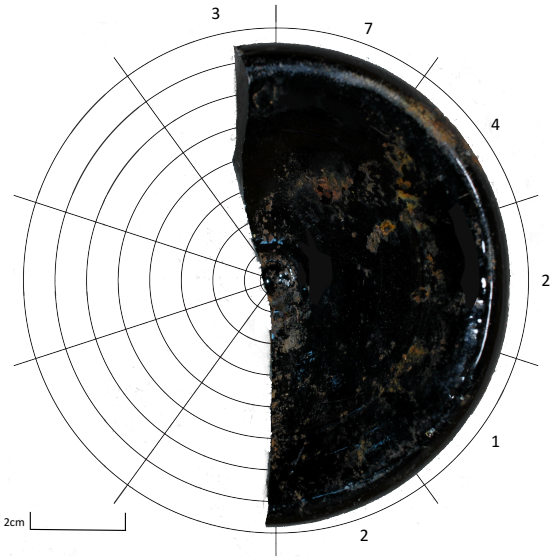
5.2.2: Applying the Scale

The scale was applied to the sample of 30 bases to see if it worked. To accommodate unevenly worn bases and incomplete specimens the wear scale was recorded for each of the ten segments making up 360° of a complete circle (or eight segments for a rectangular or square base). To use the scale, there are three steps:

1. Each segment was assessed for wear and given a score from 0 to 7.
2. The sum of the segment scores was calculated.
3. The sum of segment scores was divided by the number of segments present to give the final Use Wear Index (UWI) score.

Examples of these calculations are shown in Figures 37, 38, 39. & 40

Once the scale had been developed and procedures for applying it refined, it was used to record all the bases from the bottle exchange site (15 Lawson Street), as well as those from four comparative assemblages (Section 5.4).



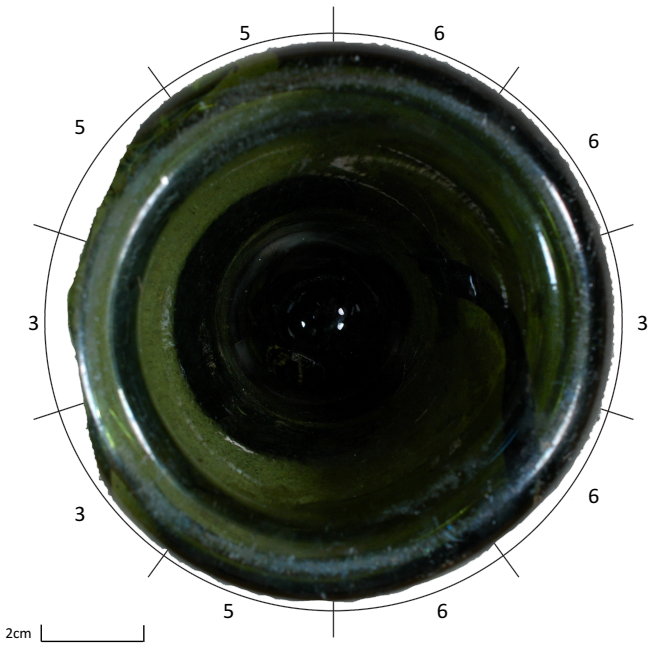
Calculations for EQ341-G-44: Base 3

3+7+4+2+1+2=15

15 ÷ 6 = 2.5

UWI Score = 2.5

Figure 37: Example of Calculation for EQ341-G-44: Base 3.



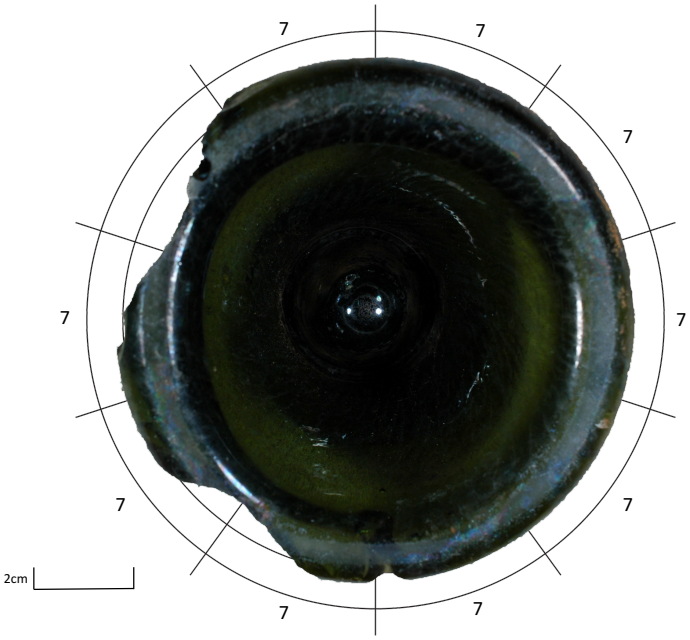
Calculations for EQ339-G-56: Base 1

6+6+3+6+6+5+3+3+5+5=48

48 ÷ 10 = 4.8

UWI Score = 4.8

Figure 38: Example of Calculation for EQ339-G-56: Base 1



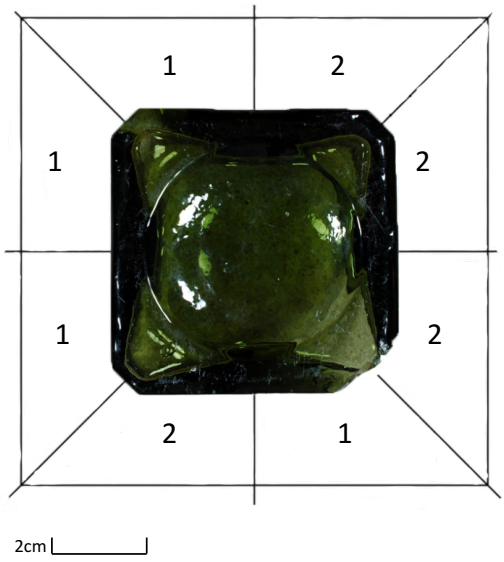
Calculations for EQ339-G-56: Base 2

7+7+7+7+7+7+7+7=

63 ÷ 9 = 7

UWI Score = 7

Figure 39: Example of Calculation for EQ339-G-56: Base 2



Calculations for EQ339-G-68: Base 2

2+2+2+1+2+1+1+1=12

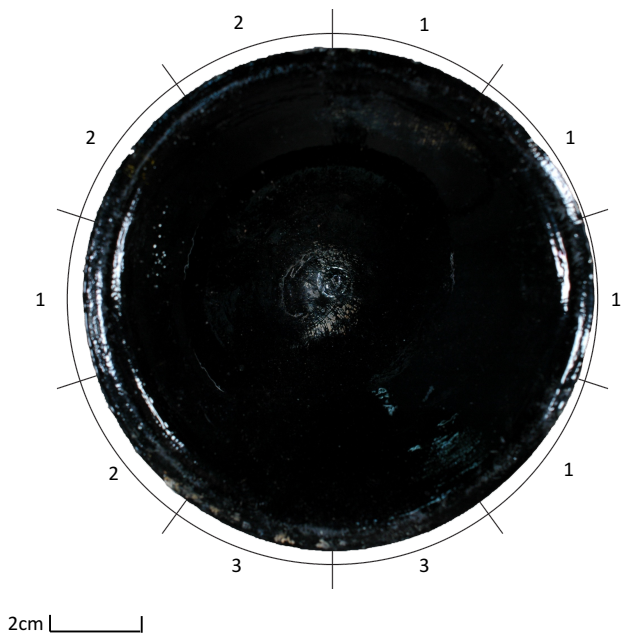
12 ÷ 8 = 1.5

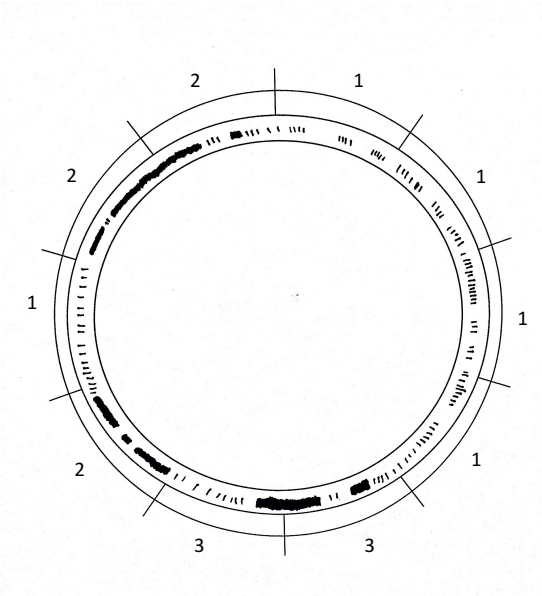
UWI Score = 1.5

Figure 40: Example of Calculation for EQ339-G-68 Base 2

Due to the large range of UWI scores established, they were classified into different categories. These were:

Less than 2.0- Low wear (Figure 41).
Between 2.0-5.0- Moderate wear (Figure 42).
Over 5.0- High/Extensive Wear (Figure 43.





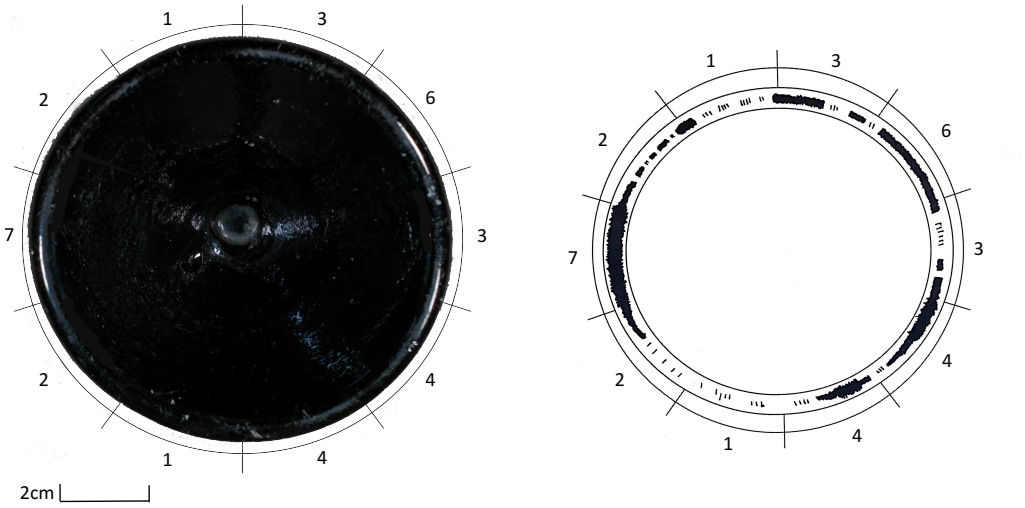
Calculations for EQ341-G-44: Base 1

1+1+1+1+3+3+2+1+2+2= 17

17 ÷ 10 = 1.7

UWI Score = 1.7 (Low Wear)

Figure 41: Example of a Base with Low Wear



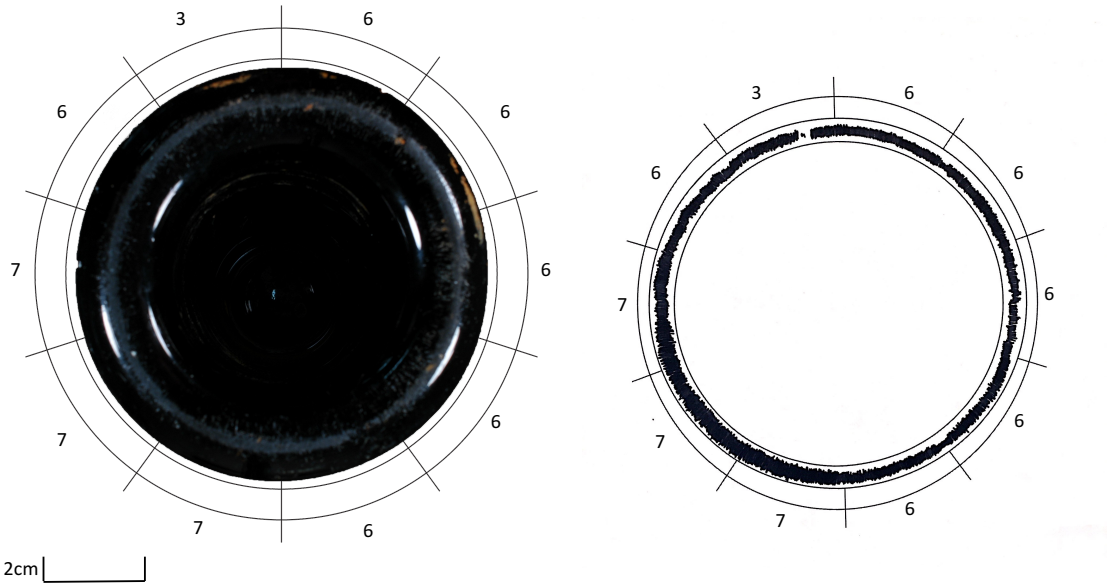
Calculations for EQ341-G-44: Base 2

3+6+3+4+4+1+2+7+2+1=33

33 ÷ 10 = 3.3

UWI Score = 3.3 (Moderate Wear)

Figure 42: Example of a Base with Moderate Wear:



Calculations for EQ334-G-73: Base 1

6+6+6+6+6+7+7+7+6+3=60

60 ÷ 10 = 6.0

UWI Score = 6.0 (High/Extensive Wear)

Figure 43: Example of a Base with High/Extensive Wear.

5.3: Artefact Analysis

In order to make meaningful comparisons between the study assemblages it was necessary to develop a consistent procedure for analysing the glass remains and grouping them into analytical units. Because the focus of attention was on the presence, form and extent of wear on the bases of glass vessels, only complete bottles and broken portions that included part of the base were included in the analysis. The bases were sorted by provenance and analysed according to the process outlined in Smith (2004) and supplemented by information from Donaldson et al (1990) and Lindsey (2017). Variables recorded included glass colour, form of the base in terms of cross-sectional shape, vertical profile and heel form, and the presence of any marks including those from mould seams and embossing. This allowed bases to be categorised into types based on the presumed original function of the vessels. For most bottles the types were named according to the presumed original contents of the vessel, using common names such as 'black' beer, 'case gin', 'salad oil', 'tumbler' or 'stemware'. For comparative purposes these types were further grouped into eight functional categories: Alcohol, Pharmaceutical, Condiment, Food-Related, Household, Personal, Other Non-Alcohol, and Tableware. A full list of common bottle names assigned to each category is given in Appendix 2.

The use of functional categories for the analysis of assemblages has been a subject of major debate in literature since it was first proposed by Stanley South (1977). Some writers have proposed alternative placement of artefact types into functional groupings (e.g. Sprague 1981) while others have argued that functional classification is inappropriate for many kinds of comparative study that archaeologists want to make (e.g. Orser Jr 1989). Another primary concern is the potential polyfunctionality of many kinds of artefacts. "Polyfunctionality refers to the potential for objects to have had more than one use, including functions for which said objects were not intended" (Brooks 2005 10). This is particularly relevant to the present study because it is focused on the reuse of bottles. As mentioned previously, reuse of glass bottles was a common practice in New Zealand in the 19th century as there was no glass bottle production until the 1920s. When

such reuse involved refilling a bottle with contents different from those for which it was originally designed it would constitute an example of polyfunctionality. Analysis of a large assemblage, in which paper labels were still adhered to many of the bottles, showed that while there were some cases of polyfunctionality, it was comparatively rare (Harris 2009). Thus, while it is impossible to rule out polyfunctionality, it seems unlikely to have played a major part in bottle reuse. In any event, the primary reason for employing the common name types and their grouping into functional categories in this study is to provide a way of organising the archaeological data that is consistent with current practice in New Zealand historical archaeology. Most analyses use these common names and functional grouping and following this practice will make it easier to apply the wear scale and make comparisons with previously analysed sites and for other studies in the future.

5.4: Comparative Assemblages

While analysing the bottle exchange it became apparent that it would be necessary to obtain other assemblages from different types of sites and environments so the results could be compared. This would provide an idea of what sites and environments would have caused more wear and hopefully would identify the different environments from which the bottles from the bottle exchange originated. The different sites comprised of one warehouse/brewery, two domestic sites and one pub/inn. These sites were situated in different locations in Christchurch and should provide information on different levels of intensity of wear that can be compared.

5.4.1: Warehouse/Brewery: 84 Hereford Street-130-136 Oxford Terrace, Christchurch

Historical Background

When the city of Christchurch was first surveyed the area now constituting 130-136 Oxford Terrace was designated Town Section 860 (Figure 44). Town Sections were quarter acre blocks laid out within the town belt (the four avenues) and purchased

from the Canterbury Association by Christchurch's first settlers (Garland et al 2014). Town Section 860 was first granted to Joseph Brittan in 1862 (LINZ c.1850 TS 860; Garland et al 2014). Little information can be identified regarding the ownership and occupancy of Town Section 860 before 1862. The section was mentioned in a newspaper advertisement in 1851 for a house on the section (Garland et al 2014). The house was owned by John McGrath, a boot and shoemaker, and is likely to have been the two-story weatherboard cottage visible on the Town Section fronting Oxford Terrance in photographs dating from the 1850 and 1860s (Figures 45 & 46; Garland et al 2014). This was when the property was sold to Walton, Warner & Co (LINZ c.1850). Walton, Warner & Co, run by Richard Walton and George Warner, was a general merchant company that operated from premises on Hereford Street (*Press* 11/4/1864). The cottage was leased to several people (Dr Courtenay Nedwill, Mr Lawrence and lastly Charles Cooper) until 1877 when it was no longer extant on the section and no further occupants were identified (Garland et al 2014).

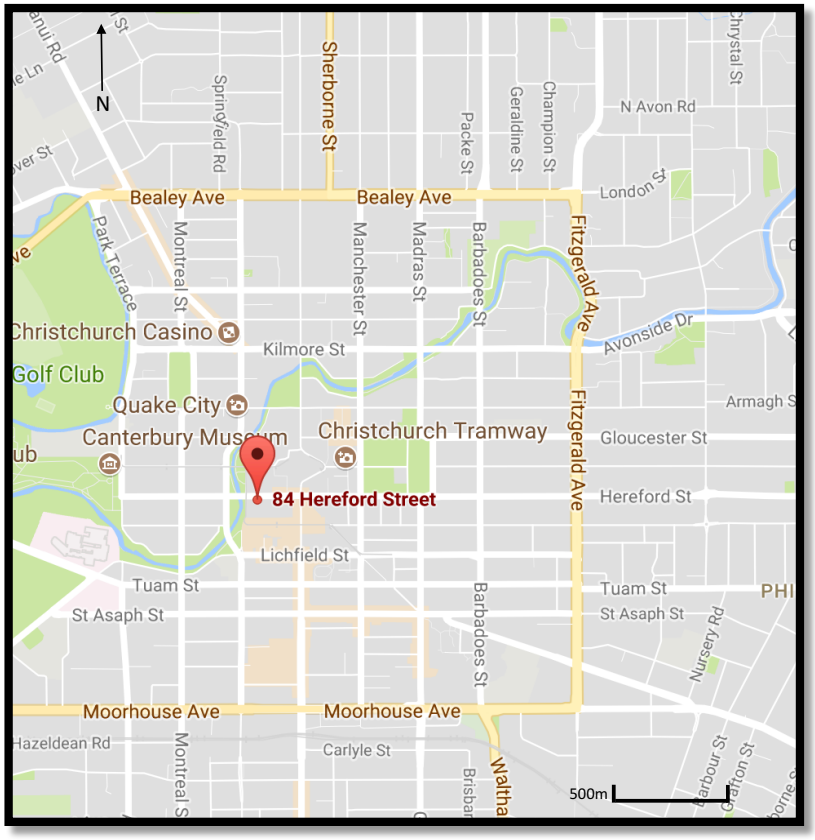


Figure 44: Map showing the location of 84 Hereford Street (warehouse site) (2017 Google Maps)

By August 1864, Walton, Warner & Co had constructed a bonded warehouse on the southern part of Town Section 860 (*Lyttelton Times* 13/08/1864). Walton, Warner & Co used the warehouse to store goods imported from outside New Zealand, which is likely to have included glass bottles. The warehouse was also used by merchants as a venue to auction their goods (Garland et al 2014). In 1870 Richard Walton sold Town Section 860 to George Warner upon his quitting of their business partnership (*Press* 20/6/1870). Warner died two years later and the business was taken over by James Shand (who had joined Walton, Warner and Co. in the 1860s) in partnership with William Wood and John Beaumont (LINZ c. 1850; *Press* 31/3/1873). The company was renamed Wood, Shand & Co (Garland et al 2014). William Wood purchased the section from the executors of Warner's estate in 1873 (LINZ c.1850). The same year, the company commissioned renowned Christchurch architect W. B. Armson to design and erect a bonded store on the section (*Press* 13/10/1873; Garland et al 2014). By March 1874 the "new fireproof bonded warehouse, Oxford Terrace, licensed as the Avon Bond" was advertised as "now ready for receiving goods for warehouse under bond." (*Press* 9/3/1874). The bases have been dated and it appears that they were associated with the Avon Bond phase of the site.

Figure 45: The Buildings on Oxford Terrace in 1861. The Canterbury Standard office is in the foreground. The cottage on Town Section 860 is the two-storied building with a verandah (Garland et al 2014 pp. 11)

The new Avon Bond building was located on the east side of Town Section 860, behind the 1864 bonded warehouse built by Walton, Warner & Co. (*Star* 20/2/1874). However, the 1864 warehouse's bond was revoked but it continued to be used by Wood, Shand & Co. as a storeroom (*Press* 19/6/1874; *Star* 23/5/1874; Garland et al 2014). In June 1874 Wood, Shand & Co. advertised the sale of the "debris from their bonded store, in Oxford terrace, comprising— Timber palings, iron tie rods, stone, sic." (*Press* 6/7/1874).

Figure 46: Oxford Terrace in 1869. At this point both the cottage (immediately to the left of the stone building and Walton, Warner & Co's bonded store are extant on Town Section 860) (Garland et al 2014 pp. 13)

By 1877, the Avon Bond and the 1864 warehouse appear to be connected, indicating that the space between them on the southern boundary of Town Section 860 may have been roofed (Garland et al 2014). In 1885 the Avon Bond was listed with a street address in the local directories for the first time (H Wise & Co. 1885‐1886). Prior to this, residents of Oxford Terrace had been listed in occupation sequence but had not been associated with any numbering system. In 1885 the Avon Bond was listed as 106 Oxford Terrace (Garland et al 2014). Wood, Shand & Co. continued operations until 1896 when the company filed for bankruptcy (*Press* 11/6/1896). At this time the Avon Bond was valued at £200. James Shand purchased the company from his partners with the aim of "continuing the business of general merchants and commission agents as carried on by the late firm; also the bonded stores in Oxford Terrace" (*Press* 28/7/1896).

The company was renamed James Shand and Co. and seems to have continued operations until 1912 (*Press* 16/3/1912). While Wood sold his share of the company to Shand he retained ownership of Town Section 860 (LINZ c. 1850). In 1897 he gave up a small strip on the northern boundary to form a right of way off Oxford Terrace (LINZ c. 1850). William Wood died in 1904 and Town Section 860 was transferred to his executors (LINZ c.1850). The year before, Shand had given up the Avon Bond buildings on the section.

The section was next occupied by W. Philpott and Sons, grain merchants, who leased the Avon Bond buildings for use as a corn store (*Press* 16/5/1903). From this location, oats, chaff, potatoes and such like were sold by the bag or truckload (Garland et al 2014). Between 1903 and 1908 the street address for the store changed to 104 Oxford Terrace, perhaps as a result of the construction of what became known as the Craddock and Simes building on the corner of Hereford Street and Oxford Terrace (*Press* 16/5/1903; 14/11/1908). In 1911 the address changed again, this time as a result of the general re-organisation of Christchurch street addresses undertaken in 1911 ‑ 1912. The Philpott buildings became 132 Oxford Terrace (*Press* 23/9/1911; Garland et al 2014).

Artefacts

The glass material studied came from Feature 2, Layer 3 and Feature 18 Layer 2 both of which are associated with the Avon Bond phase of the site, dating around 1874 (Garland et al 2014). The vast majority of the sample of 325 bottles analysed were originally alcohol bottles (only 3 out of 325 were not alcohol bottles).

5.4.2: Domestic Site 1: 16 Cotterill Street, Christchurch

Historical Background

When the city of Christchurch was first surveyed the area now constituting 16 Cotterill Street was designated Rural Section 72 (Figure 47).

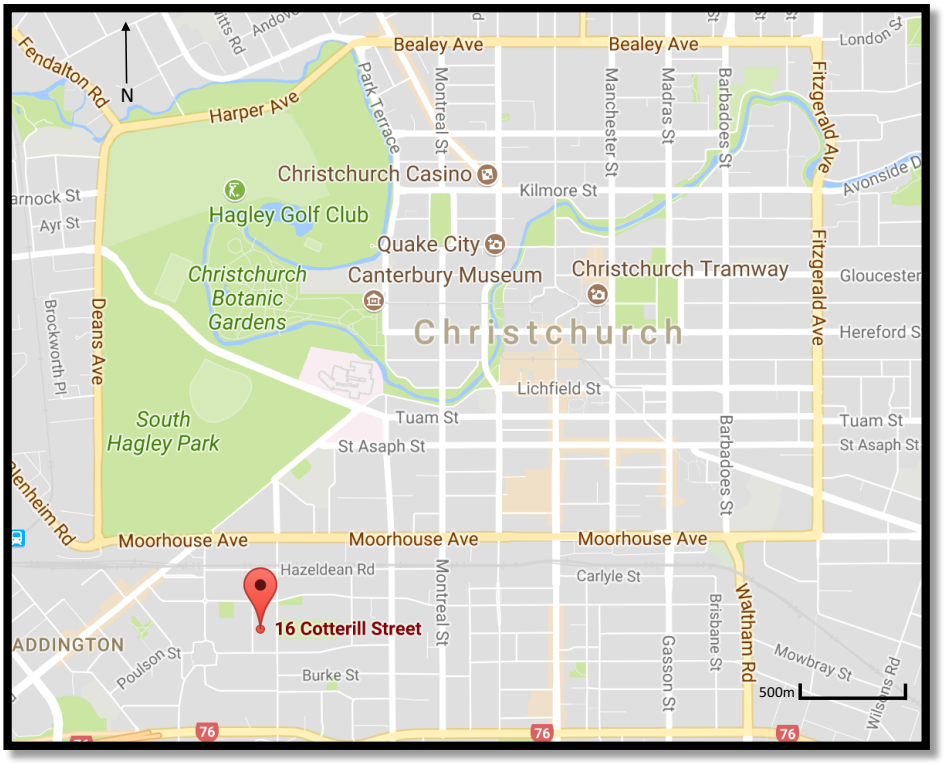


Figure 47: Map showing the location of 16 Cotterill Street (domestic site). (2017 Google Maps)

It was first purchased by Reverend Poulson but then leased to Mr Sewell in 1860 (LINZ 1860: Deeds 10 D 247). The land was then transferred from Sewel to Edward E.J. Stevens following the subdivision of RS 72 on the 29th of September 1871 (LINZ 1871: Vol 9 *Folio* 158). E.E.J. Stevens was a land agent and businessman. In 1874, the section was transferred again to a Mr. Richard Beattie who occupied it until his death in 1912. His wife continued to live on the property until her death in 1932. It was then passed on to their children (Joy Irene Beattie and Francis Richard Talbot Beattie) who sold it in 1937 (LINZ 1874 & 1912: Vol 9 *Folio* 158). After the sale by the Beattie Family, the property passed on to two further landowners (Beatrice Knight and the Trustees of the Grand Lodge Independent Order of the Oddfellows) prior to being purchased by the crown under the housing Act 1955 (LINZ 1937 & 1984: A1 Vol 9 *Folio* 1103).

Artefacts

The glass material studied from 16 Cotterill Street came from Feature 1 Layer 1, Feature 2 Layers 1 and 2, combined Feature 1, 2 and 4, Feature 3, Feature 3 Layer 1 and Feature 5 Layers 1 and 3 as well as Feature 5 that was disturbed by a digger.

There were glass artefacts in Feature 6 Layer 1 as well as in another combined Feature 7, 8, 9 and 10. Unfortunately, a bulldozer retrieved and combined Features 1, 2 and 4 as well as Features 7, 8, 9 and 10 before an archaeologist could be present on site. Despite this, the artefacts were still included in this study. Most of the bottles that were studied were originally pharmaceutical bottles with alcohol bottles also being dominant.

5.4.3: Domestic Site 2: 272-276 Worcester Street, Christchurch

Historical Background

When the city of Christchurch was first surveyed, the area now constituting 272-276 Worcester Street was designated Town Reserve 86 (Figure 48).

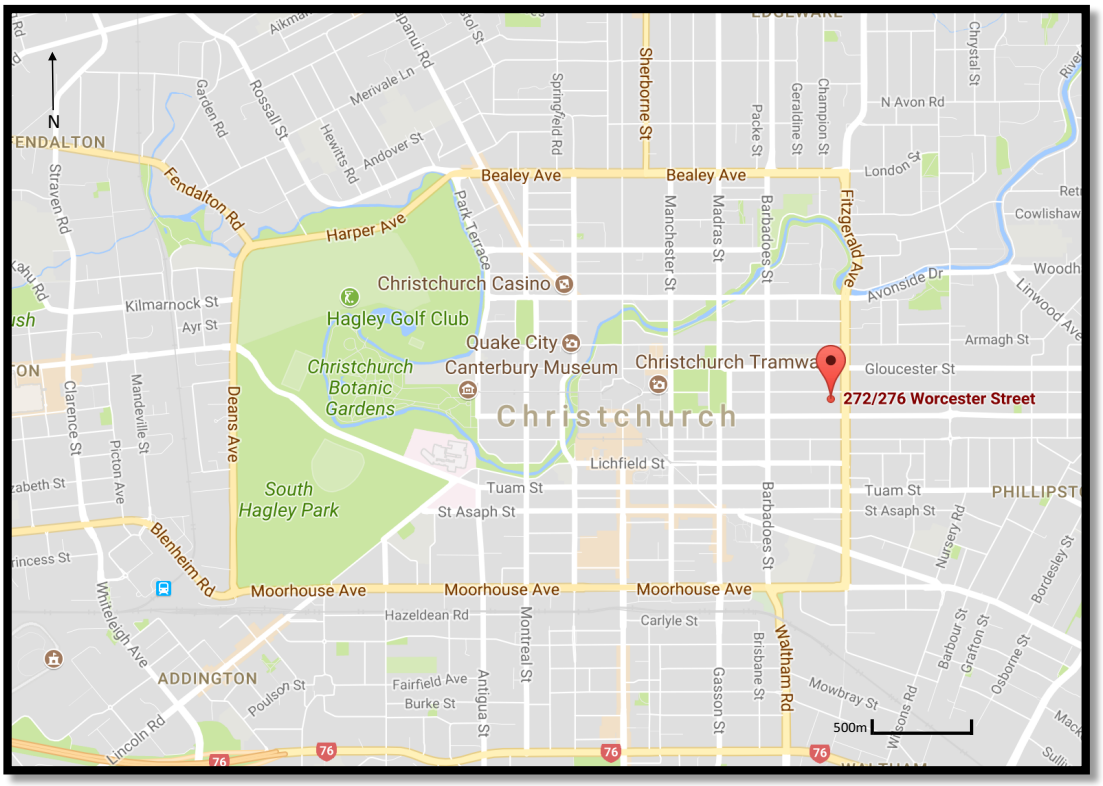


Figure 48: Map showing location of 272/276 Worcester Street (domestic site) (2017 Google Maps).

Town Reserve 86 was first purchased in June 1861 by William Bush, (a painter), then two or three phases of urban occupation followed. The block was roughly

divided into two lots. The lot with frontage on Worcester Street (272-278, 280 Worcester St and 157-165 Fitzgerald Ave) was conveyed in bulk later that year to William Dearsey (a farmer). Under Dearsey, this land was further subdivided into plots of 20 perches between 1861-63 (Habberfield-Short 2016). There is very limited information available in deeds after the properties were conveyed in 1861-63. However, early maps indicate that buildings were present on many of the lots that Dearsey subdivided from at least 1862 (Figure 49) and had either been replaced or incorporated into new structures by 1877 (Figure 50). Another phase of construction is indicated prior to 1946 (Habberfield-Short 2016).

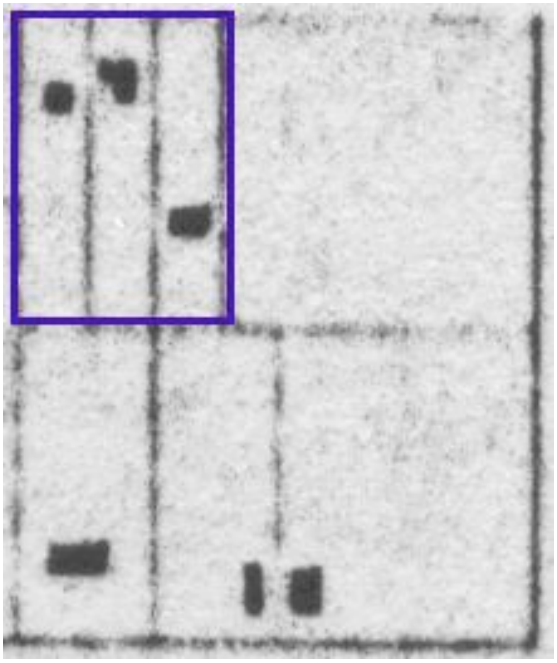


Figure 49: Fooks Map 1862 (Habberfield-Short 2016 pp. 3)

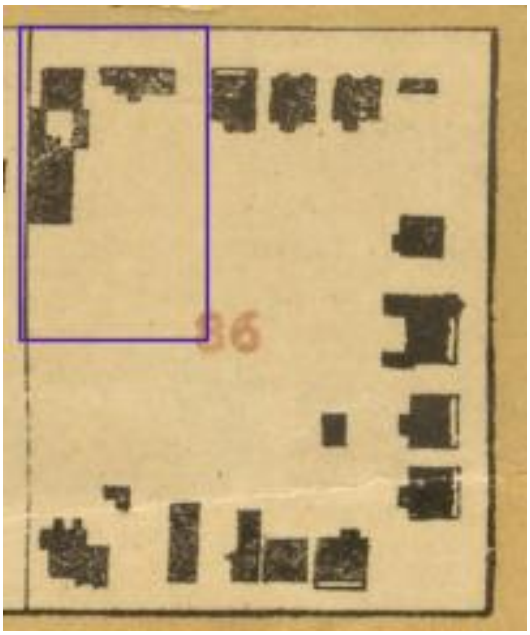


Figure 50: Strouts Map 1877. (Habberfield-Short 2016 pp. 3)

The section at 272 Worcester Street was occupied from at least 1863 when the lot was conveyed from Dearsey to James Fuller, a labourer. Fook's 1862 map shows a building footprint was present prior to the conveyance. By 1877, Strout's Map shows the building included additions towards the rear of the section (Habberfield-Short 2016). Cunliffe attributes the building she recorded to be the same structure indicated on Strout's 1877 map and notes the earliest land transfer deed is dated 1888 which states that the owner of the property was Mary Ellen Pickett, wife of William Pickett (Cunliffe 2012; Habberfield-Short 2016).

The sections at 274, 276 & 278 Worcester Street were occupied since at least 1861 when the property was conveyed from Dearsey to carpenter David Hay. Fook's 1862 map shows a building present on the street frontage at 274 Worcester Street and at the rear of 276 Worcester St (Habberfield-Short 2016). There are no mortgages recorded between 1861 and 1873 for the sections indicating that it is possible the buildings shown on Fooks map either predate David Hays ownership or were constructed by him (Habberfield-Short 2016).

Sections 274 and 276 were conveyed to Francis John Ormandy in July 1863 from David Hay and the Certificate of Title was transferred to him (Ormandy) in 1873 (Habberfield-Short 2016). Ormandy took out a mortgage in January 1874 and it was discharged in June 1876. Another was taken out the same day and transferred to his wife Matilda Emma Ormandy in 1879 (discharge date obscure). These

mortgages may relate to the construction or extension of the buildings shown on Strout's map of section 274 (Habberfield-Short 2016). The property was remortgaged in 1901 by Matilda and transferred in kind to Henry James Ormandy (a coach painter of lower Riccarton) and Guy Nathan Ormandy (a school teacher of Papanui) in 1912. From here the property remained in the Ormandy family (although it was transferred to other individuals) until 1972. Mortgages were taken out in 1939, 1953, 1972 and 1979 (Habberfield-Short 2016). These could suggest the renovation or the construction of an entire new house. It is likely that the building on 276 Worcester street relates to the mortgages taken out in 1901-1939. This is commensurate with the post 1930's architectural style bungalow extant on 276 Worcester street today (Habberfield-Short 2016).

Artefacts

The glass material analysed came from 11 separate Features within the 272-276 Worcester Street site (Features 1, 2, 3, 4, 5, 5A, 6, 7, 8, 10 & 11). Most of the glass bottles were originally alcohol bottles (consisting of approximately two thirds of the glass material) with non-alcoholic bottles being the second most dominant class.

5.4.4: Hotel/Inn: 794 Colombo Street (Oxford on Avon Hotel), Christchurch

Historical Background

The site area has a long history of use and occupation by tangata whenua. The banks of the Avon River were traditionally used by tangata whenua as mahinga kai sites for the harvest of tuna (freshwater eel), inanga (whitebait), pataki (flounder), koura (freshwater crayfish), putangitangi (paradise duck) and many other species of waterfowl, as well as harakeke (flax), raupo (bulrush) and wiwi (reeds). There is also anecdotal evidence that the site was part of Puari, an ancient Waitaha pa located on the banks of the Avon River around the Victoria Square area. Opposite the site was Market Square (now Victoria Square) which was used as a camp site and market place by Ngai Tuahuriri during the early European colonization period (Cunliffe et al 2012).

Figure 51: Map showing location of 794 Colombo Street (pub site) (2017 Google Maps).

When the city of Christchurch was first surveyed for the New Zealand Company/Canterbury Association, the area now constituting 794 Colombo Street was designated Town Reserve 16 (Figure 51). It was first owned by the Canterbury Association in 1851 but was sold to Antil Adley 10 years later in 1861 (Christchurch Deeds Index C1 c.1853 616). In 1862 Antil Adley and his wife Sarah built a wooden boarding house, with a lean-to structure serving as a pub (Figure 52; Cunliffe et al 2012). At this time, the hotel was called the Oxford Hotel (it would later become the Oxford-on-Avon). Adley had proprietorship of the hotel until his retirement in 1873 and continued to own the land and lease it out until 1903 (Christchurch Deeds Index C1 c. 1853 616; Cunliffe et al 2012).

Figure 52: Market Place, Christchurch, 1862. The wooden structure of Oxford Hotel is outlined in red (Cunliffe et al 2012 pp. 3)

The hotel was rebuilt in brick (Figures 53 & 54) in 1882-1883 by Joseph Dann and sold to John Batley in 1883. The Oxford Hotel changed hands numerous times and continued operation right up until it suffered structural damage in the 2011 earthquake (Cunliffe et al 2012).

Figure 53: View from Colombo Street bridge looking south. The Oxford Hotel is left (Cunliffe et al 2012 pp. 4)

Figure 54: Oxford Hotel, Christchurch (Cunliffe et al 2012 pp. 5)

Artefacts

The glass material studied from the Colombo Street site are from three separate features/areas of the site (Features 3 & 4 as well as a fill that was located on the NW corner of the site). Feature 3 was an extensive rubbish pit containing 19th century artefacts and was located immediately within the north-facing boundary. Feature 4 was also a rubbish pit feature that contained a large quantity of 19th century artefacts including shell and bone. Approximately three quarters of the glass material was made up of alcohol bottles. The second most common class of material studied was tableware, such as tumblers, reflecting the fact that this site was a hotel/inn.

Chapter 6: Results

This chapter presents the results of the analysis that compares five different bottle-use contexts. These include a brewery/warehouse (84 Hereford Street/ 130-136 Oxford Terrace), a pub/inn (794 Colombo Street), a bottle exchange (15 Lawson Street), and two domestic contexts (272-276 Worcester Street and 16 Cotterill Street) all of which are located in Christchurch. They are examined first in terms of assemblage composition focussing on the relative abundance of functional categories of bottle types and then in terms of the degree of wear on the bottle bases using the use wear index (UWI) developed in Chapter 5. Attention is then focussed on the most abundant category – alcohol bottles – considering the relative abundance of the various bottle types that it includes and the degree to which each of them exhibit use wear. These results will provide a basis for determining which contexts showed the most reuse as well as showing which types of bottles were reused most frequently. The use wear index scores are shown in full in Appendix 3

6.1: Assemblage Composition

Bottles were identified to type and then grouped into nine functional categories: alcohol, pharmaceutical, food-related, condiment, household, personal, non-alcohol and tableware bottles, with the final category consisting of unidentified bottles. The number and proportion of items in each category are shown in Table 6.1. The proportion of bottles not able to be identified to type varies considerably between assemblages, ranging from 0% at Hereford St to 10.4% at Lawson Street. In order to make meaningful comparisons of assemblage composition the unidentified category was removed and percentages recalculated (Figure 55).

Table 6.1 shows that alcohol bottles were the most common category in all assemblages except in the smallest, Cotterill Street. Not surprisingly, the predominance of alcohol bottles was greatest at the brewery/warehouse and pub/inn and lowest in the two domestic assemblages, with the bottle exchange falling in between.

Table 6.1: Number and percent of bottles per functional category in each assemblage

	Hereford		Colombo		Lawson		Worcester		Cotterill		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
alcohol	322	99.1	183	77.2	231	58.3	105	63.3	18	23.4	859	71.5
pharmaceutical	2	0.6	8	3.4	66	16.7	19	11.4	27	35.1	122	10.2
tableware	0	0.0	31	13.1	8	2.1	4	2.4	8	10.4	51	4.2
non-alcohol	0	0.0	5	2.1	16	4.0	23	13.9	2	2.6	46	3.8
condiment	1	0.3	6	2.5	6	1.5	6	3.6	7	9.0	26	2.2
household	0	0.0	0	0.0	16	4.0	0	0.0	2	2.6	18	1.5
food	0	0.0	1	0.4	10	2.5	2	1.2	5	6.5	18	1.5
personal	0	0.0	0	0.0	2	0.5	4	2.4	2	2.6	8	0.7
unidentified	0	0.0	3	1.3	41	10.4	3	1.8	6	7.8	53	4.4
TOTAL	325	100.0	237	100.0	396	100.0	166	100.0	77	100.0	1201	100.0

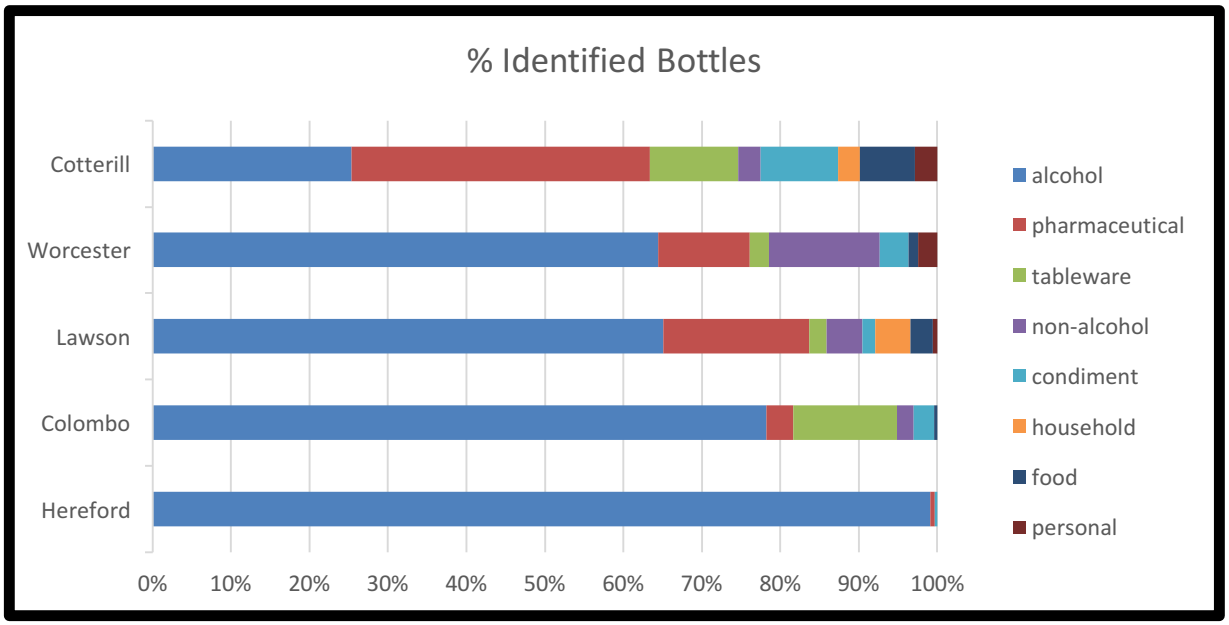


Figure 55: Proportion of identified bottles per functional category in each assemblage

The Hereford Street brewery/warehouse not only had the highest proportion of alcohol bottles (99.1%) but also the narrowest range of functional categories represented, with just two pharmaceutical bottles (0.6%) and one condiment bottle (0.3%) in addition to the alcohol bottles.

The second highest proportion of alcohol bottles (78.2%) was at the Colombo Street pub/inn, originally known as the Oxford Hotel and then the Oxford on Avon Hotel.

The second highest category here was tableware (13.2%), made up of tumblers and other drinking vessels. Surprisingly perhaps, pharmaceutical bottles (3.4%) were the third most common bottle category. The small numbers of condiment (2.5%) and food-related (0.4%) bottles suggest either that this hotel did not serve food, or that the assemblage did not include waste from the hotel kitchen. Non-alcoholic drinks contributed only 2.1% and there were no household or personal bottles.

Unlike the two previous assemblages, the Lawson Street bottle exchange yielded examples from every functional category. Alcohol bottles were most common (65.1%) followed by pharmaceuticals (18.6%). The proportions of non-alcoholic drinks and household bottles (both 4.5%), food (2.8%), tableware (2.3%), condiment (1.7%) and personal (0.4%) bottles indicate that these categories of bottles made up only a small part of the bottle exchange business.

The domestic assemblage from Worcester Street shows a strong emphasis on drinking. Alcohol bottles make up 64.4% of the identifiable types, followed by non-alcoholic drinks (14.1%), mainly in torpedo bottles. Pharmaceutical bottles were also well-represented at 11.7%. Condiments (3.7%), tableware (2.5%), personal (2.5%) and food (1.2%) bottles were present, but there were none in the household category.

The Cotterill Street domestic assemblage stands out from all the others with alcohol bottles making up only 25.4% of the identifiable types. Here pharmaceutical bottles (38%) dominated the assemblage, with tableware (11.3%) condiment (9.9%) and food-related (7%) bottles also well-represented. There were also minor quantities of non-alcoholic, household and personal bottles (all 2.8%). While it is possible that this different pattern may be influenced by the much smaller sample size of the Cotterill Street assemblage, it probably reflects the activities of a household in which alcohol did not play a prominent role.

6.2: Frequency of Wear by Functional Category

The UWI scores for each bottle were recorded on a scale from 0.0 (no wear) to 7.0 (extensive wear). For the purpose of this analysis and the distribution of scores for bottles within each functional category in each assemblage, the bottles were grouped into bins (0.0-0.9, 1.0-1.9, etc.). These data are presented and discussed here by functional category. In each case, the number of items per bin are presented in tabular form and the proportions of items from each assemblage are shown graphically.

6.2.1: Alcohol Bottles

Most alcohol bottles showed some evidence of wear with 43 bottles assigned to the 0-0.9 bin (Table 6.2). However, the majority had only low to moderate wear with most bottles having UWI scores of less than 3.0 (Figure 56). The Hereford St warehouse had the highest proportion in the 1-1.9 bin and the Lawson St bottle exchange had the highest in the 2-2.9 bin. The two domestic assemblages had smaller proportions of low-to-moderate wear bottles, with the Colombo St pub falling in between.

Table 6.2: UWI scores per assemblage for Alcohol bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	40	0	2	1	0
1.0-1.9	240	96	94	45	6
2.0-2.9	18	62	73	30	5
3.0-3.9	12	17	27	15	0
4.0-4.9	7	6	19	7	3
5.0-5.9	5	1	11	5	4
6.0-6.9	0	1	3	2	0
7.0-7.9	0	0	2	0	0
Total	322	183	231	105	18

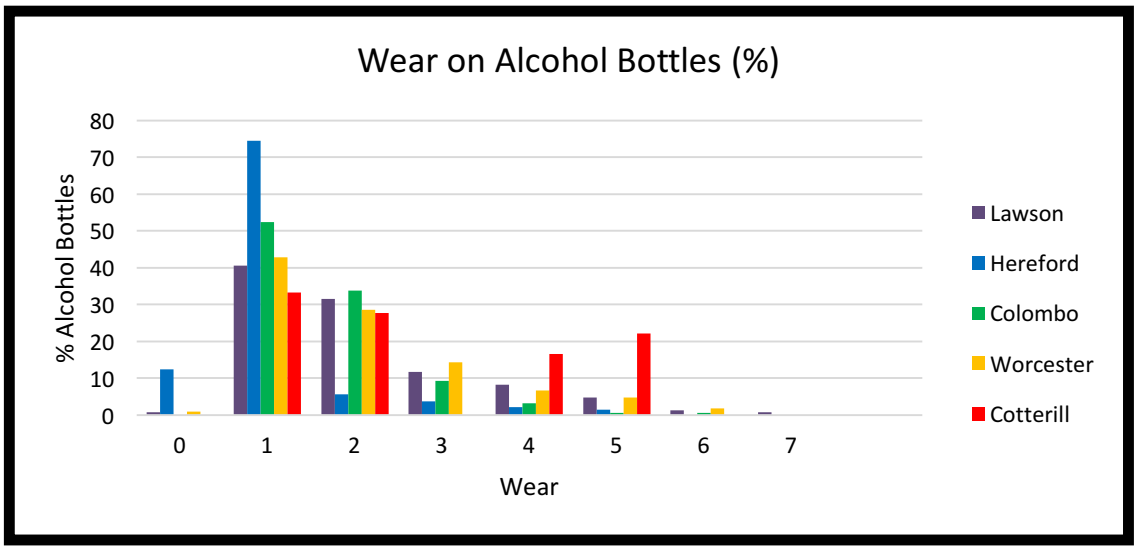


Figure 56: Frequency of Wear on Alcohol Bottles (Percentage of all Alcohol Bottles per assemblage)

The Hereford St warehouse displays a large proportion (74.5%) with very little wear (1-1.9) suggesting it had the least use wear. While the Cotterill St assemblage exhibited the highest levels of use wear on alcohol bottles with 16.67% having a score of 4-4.9 and 22.2% with a score of 5-5.9, the small size of the Cotterill Street assemblage needs to be taken into account here as there were only three or four bottles in each of these two bins. Nonetheless, the Worcester St domestic assemblage exhibits the second highest proportion of alcohol bottles with UWI scores ≥3.0 suggesting that use wear on alcohol bottles was generally higher in household contexts than elsewhere.

The highest use wear scores on alcohol bottles were recorded at the Lawson St bottle exchange where two achieved the maximum possible score of 7. As Figure 56 shows, the alcohol bottles from this site were more widely spread across the use wear range than elsewhere with bottles in every score bracket.

6.2.2: Pharmaceutical bottles

Pharmaceutical bottles had high numbers with low intensity of wear (Table 6.3). Most sites had pharmaceutical bottles assigned to the 0.0-0.9 bin (the Cotterill Street domestic site had 17 bottles out of a total of 27). Only the Hereford brewery assemblage did not have a single bottle in the lowest bin, however it did have two

in the 1.0-1.9 bin. The Lawson Street Bottle Exchange had the highest proportion in both 0.0-0.9 and 1.0-1.9 bins whereas both domestic sites had more pharmaceutical bottles than the Colombo Pub and the Hereford Brewery combined. Only 4 pharmaceutical bottles (2 from Colombo Pub, 1 from Lawson Bottle Exchange and 1 from Worcester Street Domestic) had moderate wear with an UWI score of 4.0-4.9 whereas the rest had low wear with UWI scores of less than 2.9.

Table 6.3: UWI scores per assemblage for Pharmaceutical bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	0	2	25	1	17
1.0-1.9	2	2	37	13	9
2.0-2.9	0	2	3	4	1
3.0-3.9	0	0	0	0	0
4.0-4.9	0	2	1	1	0
5.0-5.9	0	0	0	0	0
6.0-6.9	0	0	0	0	0
7.0-7.9	0	0	0	0	0
Total	2	8	66	19	27

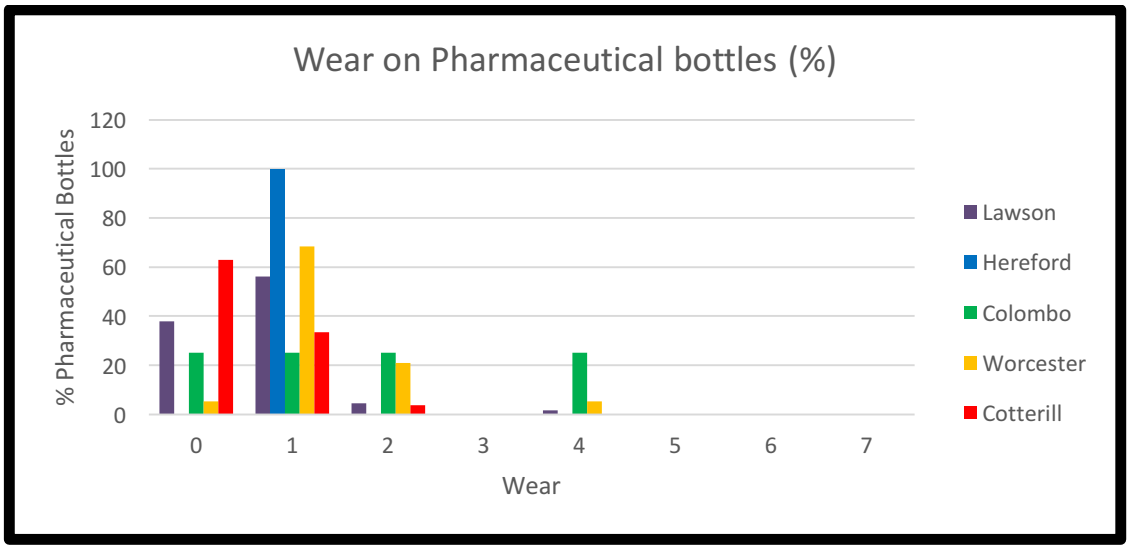


Figure 57: Frequency of Wear on Pharmaceutical Bottles (Percentage of all Pharmaceutical Bottles per assemblage)

None of the contexts exhibit extensive wear on their pharmaceutical bottles with nothing above the 4-4.9 score bracket (Figure 57). The Colombo pub yielded 25% with a score of 4-4.9, however, with only eight pharmaceutical bottles in this assemblage, proportional values are likely to be misleading. This applies also to the

two items from Hereford St which give a 100% value in the 1-1.9 bin. The Lawson Street Bottle Exchange and Worcester St also had bottles in the 4-4.9 UWI score bracket (Lawson Street 1.5% and Worcester Street 5.3%). The Worcester St domestic site displays the highest amount of use wear with 68.4% having a score of 1-1.9 and 21.1% with a score of 2-2.9 as well as the lowest percentage (5.3%) in the UWI score bracket of 0-0.9. This indicates that use wear on pharmaceutical bottles was higher in household contexts and that reuse of pharmaceutical bottles was not overly common.

6.2.3: Glass Tableware

The Colombo Street pub not only had the highest proportion of glass tableware but also the most extensive wear with 8 glasses within the 5.0-5.9 bin (Table 6.4). The Cotterill Street domestic site produced the highest wear score of 6.0-6.9 but only one glass was in this score bracket. The Colombo Street site yielded the highest proportion in every bin below 6.0 except for 0.0-0.9 where it had zero.

Table 6.4: UWI scores per assemblage for Glass Tableware

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	0	0	4	0	3
1.0-1.9	0	4	4	3	2
2.0-2.9	0	9	0	1	1
03.0-3.9	0	3	0	0	0
4.0-4.9	0	7	0	0	1
5.0-5.9	0	8	0	0	0
6.0-6.9	0	0	0	0	1
7.0-7.9	0	0	0	0	0
Total	0	31	8	4	8

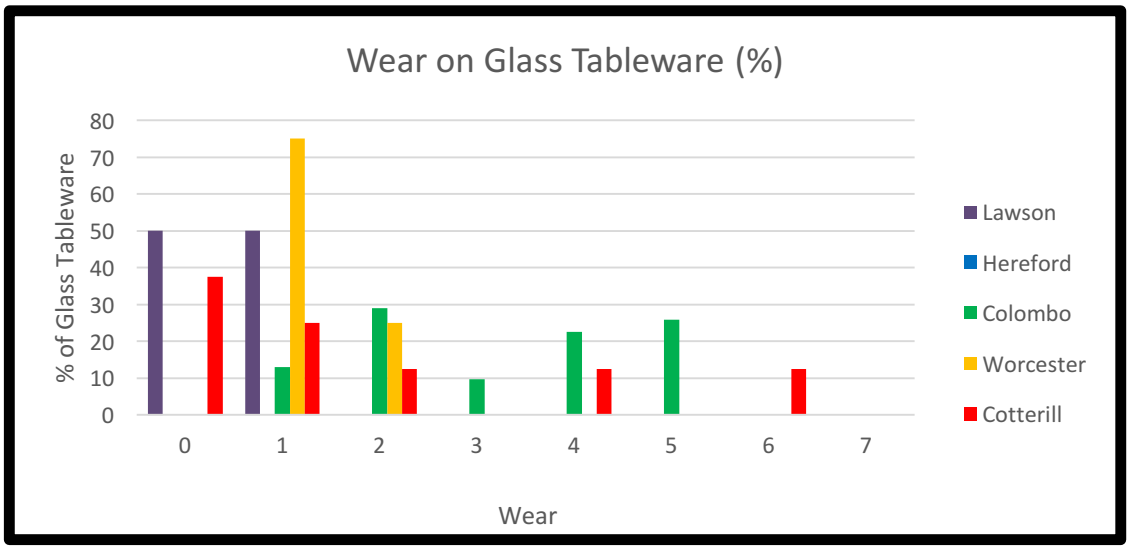


Figure 58: Frequency of Wear on Glass Tableware (Percentage of Glass Tableware per Assemblage)

Colombo Street exhibited the highest levels of use wear on glass tableware with 22.6% having a score of 4.0-4.9 and 25.08% with a score of 5.0-5.9 (Figure 58). With sample sizes less than 10, percentage values for the other assemblages are probably not especially meaningful. Nonetheless, it can be noted that in each case the majority of bottles had low UWI scores with only Cotterill Street exhibiting scores greater than 2.9. Despite these limitations it seems clear that use wear on glass tableware was generally higher in pub/inn contexts where drinking was popular.

6.2.4: Non-Alcohol Bottles

Non-alcohol bottles showed moderate wear with the highest score being 6.0-6.9, however two sites, the Colombo pub and the Lawson bottle exchange, had bottles in the 0.0-0.9 bin thus displaying minimal wear (Table 6.5). The Worcester Street domestic site produced both the highest number of non-alcohol bottles as well as the highest wear score and the most bottles in one score bin (10 bottles in the 1.0-1.9 score bracket). Neither Cotterill Street nor Worcester Street had a single bottle in the lowest score bin, however, Cotterill Street yielded the lowest number of bottles (2). Only three bottles (one from Lawson Street and two from the domestic sites) had extensive wear whereas the rest did score more than 5.0.

Table 6.5: UWI scores per assemblage for Non-Alcohol bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	0	1	3	0	0
1.0-1.9	0	1	6	10	1
2.0-2.9	0	3	3	8	0
03.0-3.9	0	0	1	4	0
4.0-4.9	0	0	2	0	0
5.0-5.9	0	0	1	0	1
6.0-6.9	0	0	0	1	0
7.0-7.9	0	0	0	0	0
Total	0	5	16	23	2

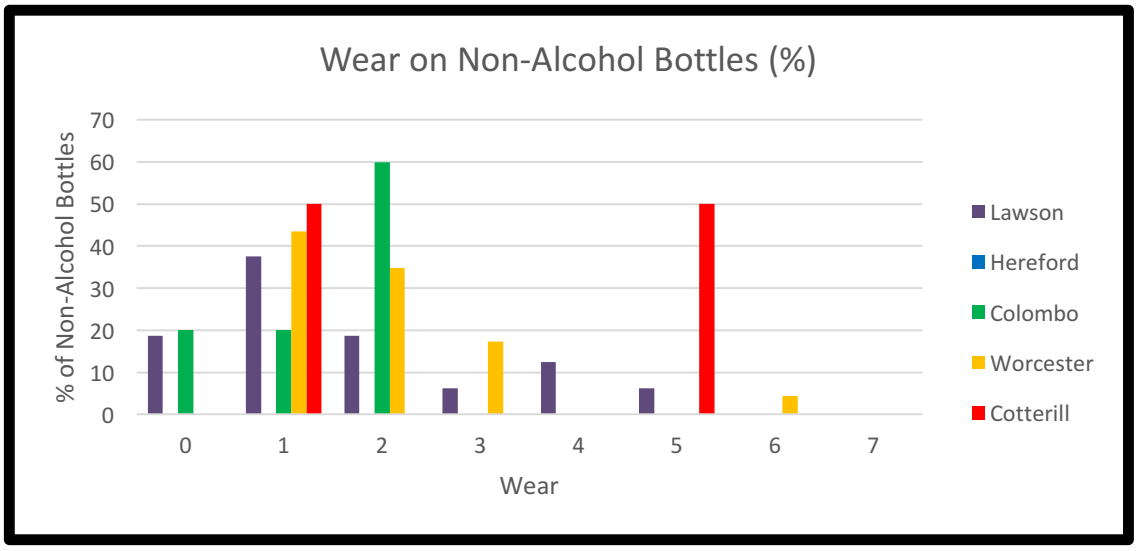


Figure 59: Frequency of Wear on Non-Alcohol Bottles (Percentage of l Non-Alcohol Bottles per assemblage)

Only the Worcester and Lawson St assemblages are large enough for meaningful interpretation of the proportional distribution of UWI scores (Figure 59). Worcester Street exhibited the highest wear score with 4.3% of the non-alcohol bottles producing a score of 6.0-6.9 and 17.4% a score of 3.0-3.9 and its lowest scores were in the 1.0-1.9 bin. The range of scores from the Lawson Street bottle exchange was slightly lower with 16.7% in the 0-0.9 range extending up to 6.3% in the 5.0-5.9 range. Overall however, the two assemblages were broadly similar with 75% of the Lawson St bottles and 78% of those from Worcester St exhibiting UWI scores below 3.0. Despite their small size the Colombo and Cotterill St assemblages are still useful, as they confirm the impression that use wear on non-alcohol bottles

was generally higher in household contexts. These results also indicate that non-alcohol bottles were reused often.

6.2.5: Condiment Bottles

Overall, a small quantity of condiment bottles was found in each context and these had low-moderate wear with not a single bottle above a UWI score of 5. The Hereford brewery had the lowest number with just one bottle which was in the score bracket of 1.0-1.9. Again, Worcester Street had the highest wear score with one bottle having the score of 4.0-4.9.

Table 6.6: UWI scores per assemblage for Condiment bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	0	2	3	1	2
1.0-1.9	1	1	2	1	4
2.0-2.9	0	2	1	3	0
03.0-3.9	0	1	0	1	1
4.0-4.9	0	0	0	1	0
5.0-5.9	0	0	0	0	0
6.0-6.9	0	0	0	0	0
7.0-7.9	0	0	0	0	0
Total	1	6	6	6	7

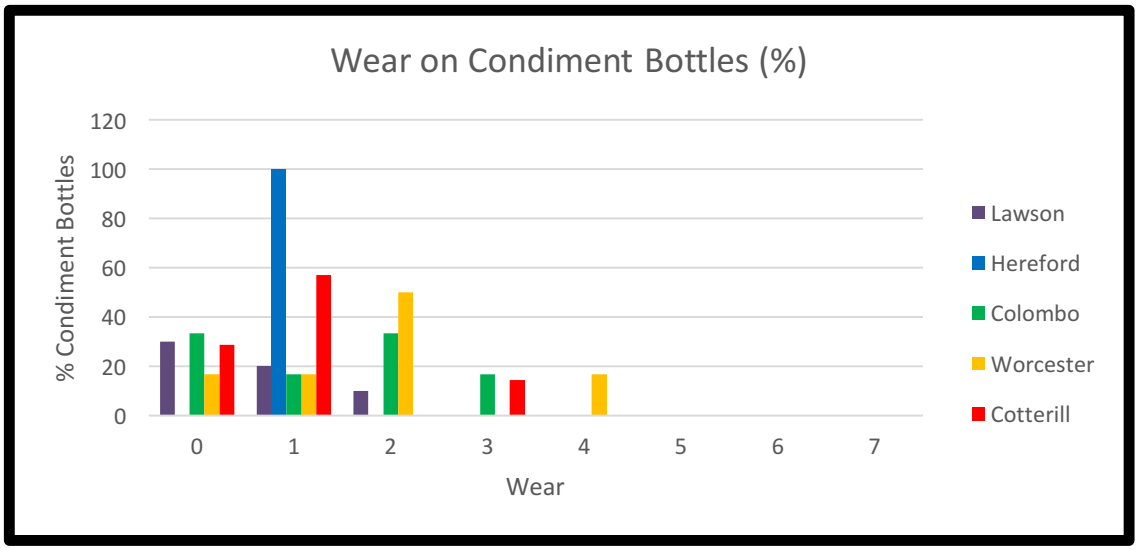


Figure 60: Frequency of Wear on Condiment Bottles (Percentage of Condiment Bottles per assemblage)

The small samples sizes make it difficult to make meaningful interpretations of the proportional distribution of UWI scores (Figure 60). Worcester Street produced both the highest wear score of 4.0-4.9 and the lowest (0.0-0.9). The only environment that had relatively evenly spread percentages was the Colombo pub (33.3% in 0.0-0.9 and 2.0-2.9 as well as 16.67% in 1.0-1.9 and 3.0-2.9). Once again, Worcester Street had the highest levels of wear thereby indicating that use wear on condiment bottles was higher in household contexts.

6.2.6: Household Bottles

Only two environments yielded household bottles within their assemblages. These consisted of ink or glue bottles or shoe polish and cleaning products. The Lawson Street bottle exchange exhibited the highest number of these bottles with 16 in total whereas the Cotterill Street domestic site produced just 2. Table 6.7 indicates that household bottles had extremely low levels of wear. Lawson Street yielded 9 bottles with a score of 0.0-0.9 and 7 bottles with a score of 1.0-1.9. Cotterill Street had similar results with the two bottles having a score of 1.0-1.9.

Table 6.7: UWI scores per assemblage for Household bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	0	0	9	0	0
1.0-1.9	0	0	7	0	2
2.0-2.9	0	0	0	0	0
03.0-3.9	0	0	0	0	0
24.0-4.9	0	0	0	0	0
5.0-5.9	0	0	0	0	0
6.0-6.9	0	0	0	0	0
7.0-7.9	0	0	0	0	0
Total	0	0	16	0	2

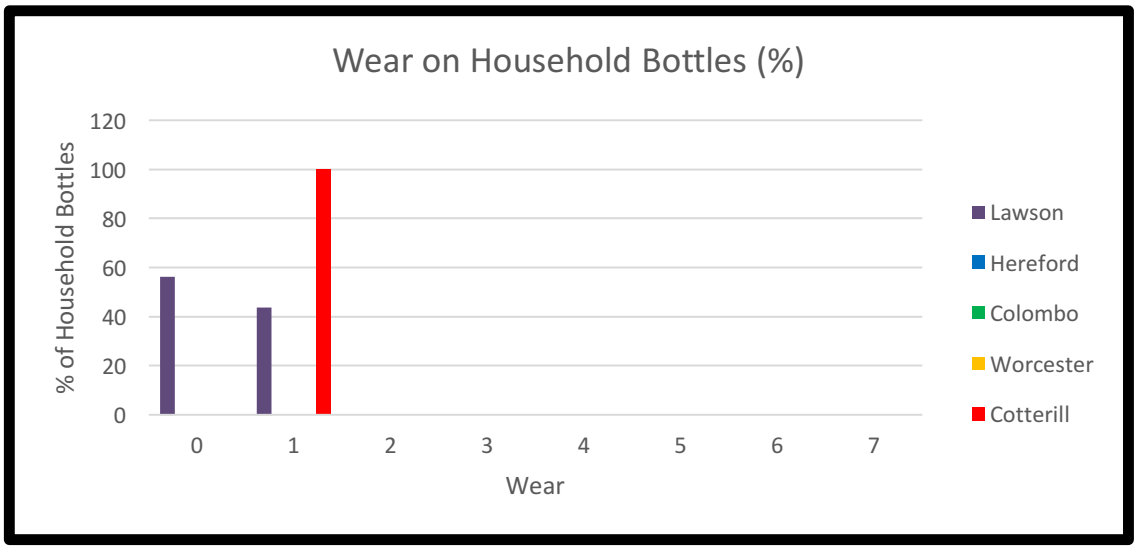


Figure 61: Frequency of Wear on Household Bottles (Percentage of Household Bottles per assemblage)

Only the Lawson Street assemblage is large enough to provide a meaningful picture of UWI scores (Figure 61). This showed 56.2% of the household bottles in the lowest wear category and 43.8% in the 1.0-1.9 bin.

6.2.7: Food-Related Bottles

As shown in Tables 6.1 & 6.8, there were small quantities of food-related bottles found at the sites. Both of the domestic sites had bottles with low to moderate wear while the others had extremely low wear. Worcester Street yielded one bottle with a score of 4.0-4.9 and both Cotterill and Worcester Streets domestic sites had one bottle with a score of 3.0-3.9. Lawson Street had the highest number of food-related bottles (10) with 7 of them having a score of 1.0-1.9 and one with 2.0-2.9. Lawson Street had two bottles with the low score of 0.0-0.9 and Cotterill Street yielded two bottles in the same score bracket (0.0-0.9).

Table 6.8: UWI scores per assemblage for Food-Related bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	0	0	2	0	2
1.0-1.9	0	1	7	0	2
2.0-2.9	0	0	1	0	0
3.0-3.9	0	0	0	1	1
4.0-4.9	0	0	0	1	0
5.0-5.9	0	0	0	0	0
6.0-6.9	0	0	0	0	0
7.0-7.9	0	0	0	0	0
Total	0	1	10	2	5

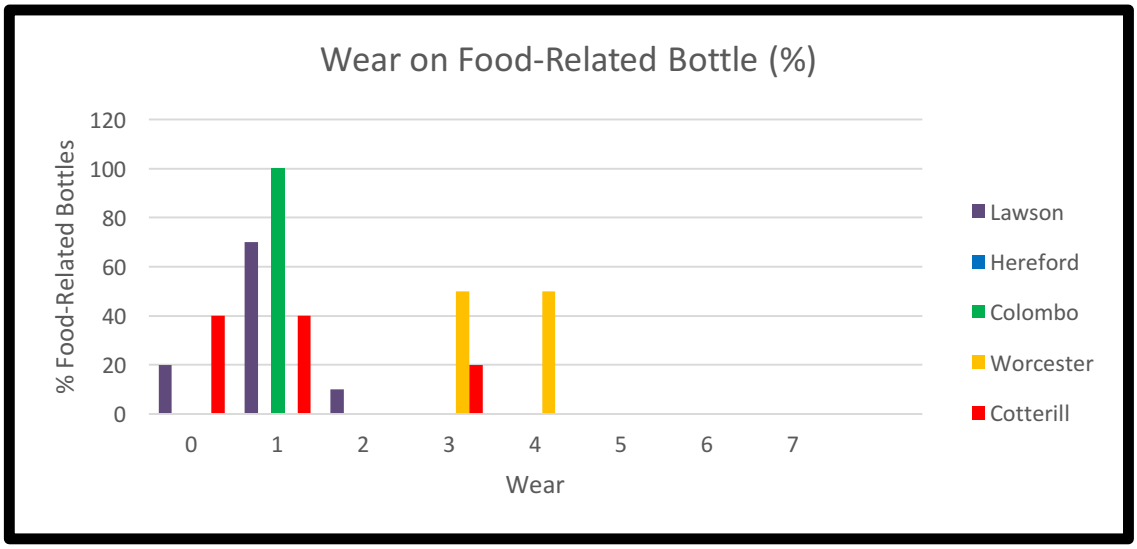


Figure 62: Frequency of Wear on Food- Related Bottles (Percentage of Food-related Bottles per assemblage)

Most of these assemblages are too small to be really useful (Figure 62). However, it can be noted that the only assemblages with any UWI scores greater than 3.0 were at Worcester and Cotterill Streets suggesting that the reuse of food-related bottles was higher in household contexts.

6.2.8: Personal Bottles

The category with the least number of items was Personal Bottles with 8 in total (Table 6.9). Only three sites (Lawson Street, Worcester Street and Cotterill Street) yielded personal bottles in their assemblages and they exhibited low wear with the highest score being 2.0-2.9. The Lawson Street bottle exchange as well as the Cotterill Street domestic site both had two bottles with a score of 0-0.9 and

therefore these sites showed extremely low intensity of wear. The Worcester Street domestic site, however, yielded four bottles with two having a score of 1.0-1.9 and the other two, 2.0-2.9.

Table 6.9: UWI scores per assemblage for Personal bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	0	0	2	0	2
1.0-1.9	0	0	0	2	0
2.0-2.9	0	0	0	2	0
03.0-3.9	0	0	0	0	0
4.0-4.9	0	0	0	0	0
5.0-5.9	0	0	0	0	0
6.0-6.9	0	0	0	0	0
7.0-7.9	0	0	0	0	0
Total	0	0	2	4	2

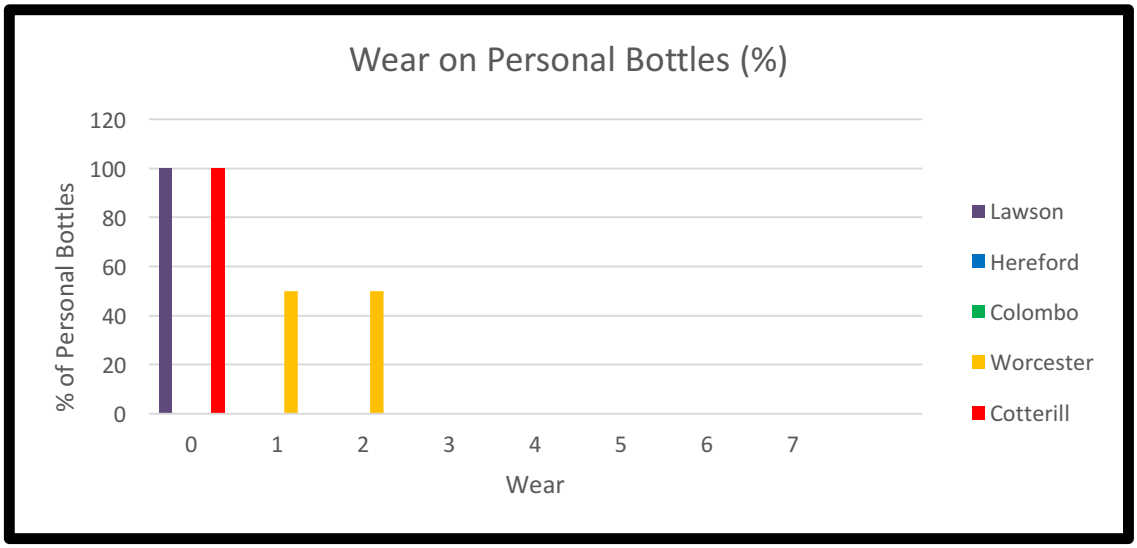


Figure 63: Frequency of Wear on Personal Bottles (Percentage of Personal Bottles per assemblage)

Small samples size again precludes detailed analysis of proportional representation of wear scores but it can be noted that Worcester Street produced the two highest wear scores (1.0-1.9 & 2.0- 2.9), again, suggesting that use wear was higher in household contexts (Figure 63).

6.3: Proportion of Alcohol Bottles (All Contexts)

This section will focus entirely on the most common functional category - Alcohol Bottles. Bottles were identified to type and then grouped into 8 different alcohol bottle categories. These were Black Beer, Ring-seal, Case Gin, Wine/Beer, Other Wine, Other Beer and Other Spirit bottles with the final category consisting of unidentified alcohol bottles. The number and proportion of items in each category are shown in Table 6.10. The proportion of alcohol bottles not able to be identified to type varies considerably between assemblages ranging from 0% at Hereford Street and Colombo Street to 16.6% at Cotterill Street. In order to make meaningful comparisons of assemblage composition the unidentified category was removed and percentages recalculated (Figure 64).

Table 6.10 shows that black beer bottles were the most common category in all assemblages except the smallest, Cotterill Street.

Table 6.10: Number and percent of bottles per alcohol category in each assemblage

	Hereford		Colombo		Lawson		Worcester		Cotterill		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Black Beer	200	62.1	150	82.0	107	46.3	68	64.8	6	33.3	531	61.8
Ring-Seal	82	25.5	2	1.1	49	21.2	7	6.7	1	5.6	141	16.4
Case Gin	1	0.3	0	0	13	5.6	15	14.3	6	33.3	35	4.1
Wine/Beer	0	0	28	15.3	15	6.5	0	0	1	5.6	44	5.1
Other Wine	1	0.3	0	0	30	13.0	0	0	0	0	31	3.6
Other Beer	6	1.9	0	0	6	2.6	1	0.9	0	0	13	1.5
Spirit	32	9.9	3	1.6	8	3.5	13	12.4	1	5.6	57	6.6
unidentified	0	0	0	0	3	1.3	1	0.9	3	16.6	7	0.9
TOTAL	322	100.0	183	100.0	231	100.0	105	100.0	18	100.0	859	100.0

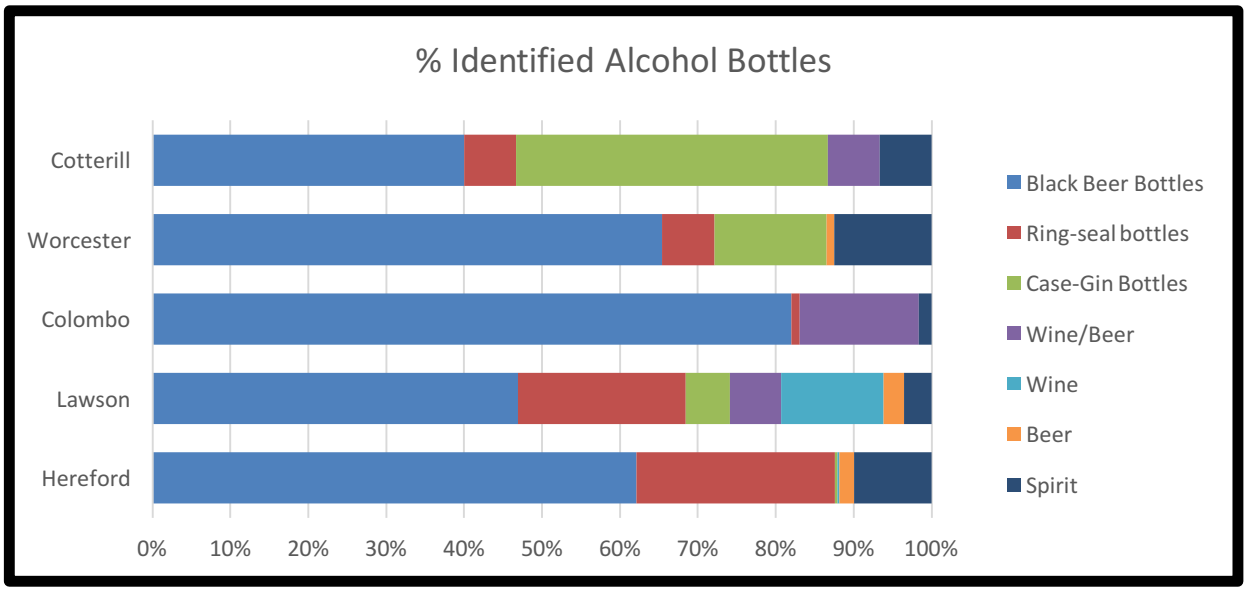


Figure 64: Proportion of identified bottles per alcohol category in each assemblage

The Hereford Street warehouse/brewery had a large proportion of black beer bottles (62.1%), however, it also had the largest proportion of ring-seal bottles with 25.5%. Nevertheless, the small quantities of the case gin (0.3%) and the other spirit bottles (9.9%) suggest that the site was a warehouse for substances that came in black beer bottles as well as in ring-seal bottles. The small amount of separate wine (0.3%) and beer (1.8%) categories would support this. There were no beer/wine bottles found at this site.

The bottle exchange that was located in Lawson Street had the most variety of alcohol bottles with bottles in every category. Again, black beer (46.9%) and ring-seal bottles (21.5%) were most common but there were decent quantities of all bottle types with wine being the next largest (13.2%) followed by case-gin (5.7%) and wine/beer bottles (6.6%). The spirit (3.5%) and beer bottles (2.6%) were the lowest but still made up a good proportion especially when compared to the other sites. This would suggest that alcohol bottles were a major portion of the bottle exchange business and they did not distinguish between the bottle types that they received.

The Colombo Street pub/inn not only had the largest proportion of black beer bottles with 82% but also the narrowest range of alcohol bottle categories represented, with only three other bottle categories. There were 28 wine bottles

(15.3%) as well as small quantities of ring-seal (1.1%) and spirit bottles (1.7%). This indicates that the majority of the liquids sold at the pub/inn were in black beer bottles with a small amount in wine bottles.

The Worcester Street domestic site showed a large emphasis on black beer bottles with 65.4%. However, it also yielded large quantities of spirit bottles with 15 case gin bottles (14.2%) and 12 other spirit bottles (12.5%). With only 6.7% of the alcohol bottles found in Worcester Street being ring-seal bottles as well as 0.9% being other beer bottles, it would suggest that the people in this household preferred to drink spirits as well as black beer.

The Cotterill Street domestic site had a main emphasis on spirit bottles with case gin bottles representing 40% and other spirit bottles 6.7% of the alcohol bottles found at this site. However, black beer bottles were also well represented with 40% while both ring-seal and wine/beer bottles made up 6.7% of the alcohol bottles here. This reveals that spirit bottles were preferred in household contexts probably due to the higher alcohol content.

6.4: Frequency of Wear by Different Alcohol Bottle Types

This section will focus on bottle type as opposed to their functional category. The UWI scores for each bottle were recorded on a scale from 0.0 (no wear) to 7.0 (extensive wear). For the purpose of this analysis and the distribution of scores for bottles within each alcohol bottle type in each assemblage, the bottles were grouped into bins (0.0-0.9, 1.0-1.9, etc.). In each case, the number of items per bin are presented in tabular form and the proportions of items from each assemblage are shown graphically.

6.4.1: Black Beer Bottles

Almost all black beer bottles showed some evidence of wear with only the Hereford Street brewery having 39 bottles assigned to the 0-0.9 bin. However, the overall majority had low to moderate wear with most black beer bottles having UWI scores of less than 4.0. The Hereford Street brewery/warehouse had the highest proportion in the 1-1.9 bin whereas the Colombo pub had the highest proportion in the 2.0-2.9 bin. The two domestic assemblages had smaller proportions of low-to-moderate wear bottles with the Lawson St bottle exchange falling in between these.

Table 6.11: UWI scores per assemblage for Black Beer Bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	39	0	0	0	0
1.0-1.9	147	83	37	30	4
2.0-2.9	6	52	46	18	1
03.0-3.9	5	12	10	10	0
4.0-4.9	2	1	7	5	0
5.0-5.9	1	1	5	4	1
6.0-6.9	0	1	2	1	0
7.0-7.9	0	0	0	0	0
Total	200	150	107	68	6

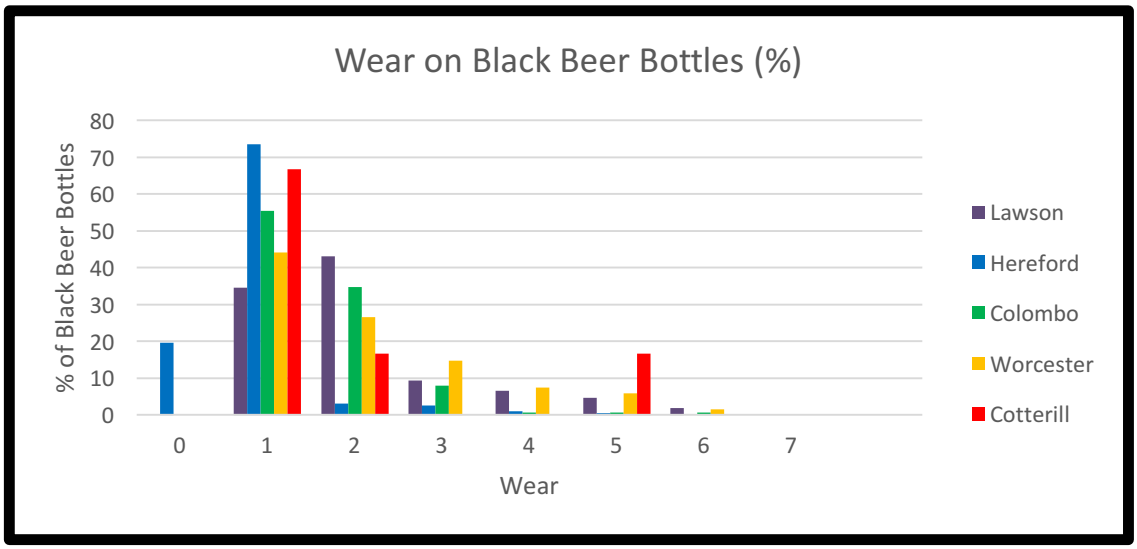


Figure 65: Frequency of Wear on Black Beer Bottles (Percentage of Black Beer Bottles per Assemblage)

The Cotterill Street assemblage exhibited the highest levels of wear with 16.67% having a score of both 5-5.9 and 2-2.9. This site also had one of the highest proportions assigned to the 1.0-1.9 bin however the small size of the assemblage has to be taken into account. The Worcester Street domestic assemblage exhibited the second highest proportion of black beer bottles with UWI scores ≥3.0 suggesting that use wear on black beer bottles was generally higher in household contexts than elsewhere. As shown in Figure 65, the Lawson Street bottle exchange, the Worcester Street domestic site and the Colombo Street pub/inn have bottles in every score bracket (except 0.0-0.9) and are widely spread. This suggests that black beer bottles, in general, were commonly reused.

6.4.2: Ring-Seal Bottles

The Hereford Street warehouse/brewery had the highest number of ring-seal bottles (82) with the Lawson Street bottle exchange yielding the second highest (49). Both sites exhibited low to extensive wear with bottles in every score bracket under 6.0. Hereford Street had the highest proportion in the 1.0-1.9 and 2.0-2.9 bins whereas Lawson Street had the highest proportion in 3.0-3.9 and 4.0-4.9 bins. Colombo Street had the second lowest proportion and had the lowest wear because it was the only site without a ring-seal bottle with a UWI score over 3.0.

Table 6.12: UWI scores per assemblage for Ring-Seal Bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	1	0	1	0	0
1.0-1.9	54	1	18	2	0
2.0-2.9	11	1	10	0	0
3.0-3.9	7	0	8	2	0
4.0-4.9	5	0	8	1	1
5.0-5.9	4	0	3	1	0
6.0-6.9	0	0	0	1	0
7.0-7.9	0	0	1	0	0
Total	82	2	49	7	1

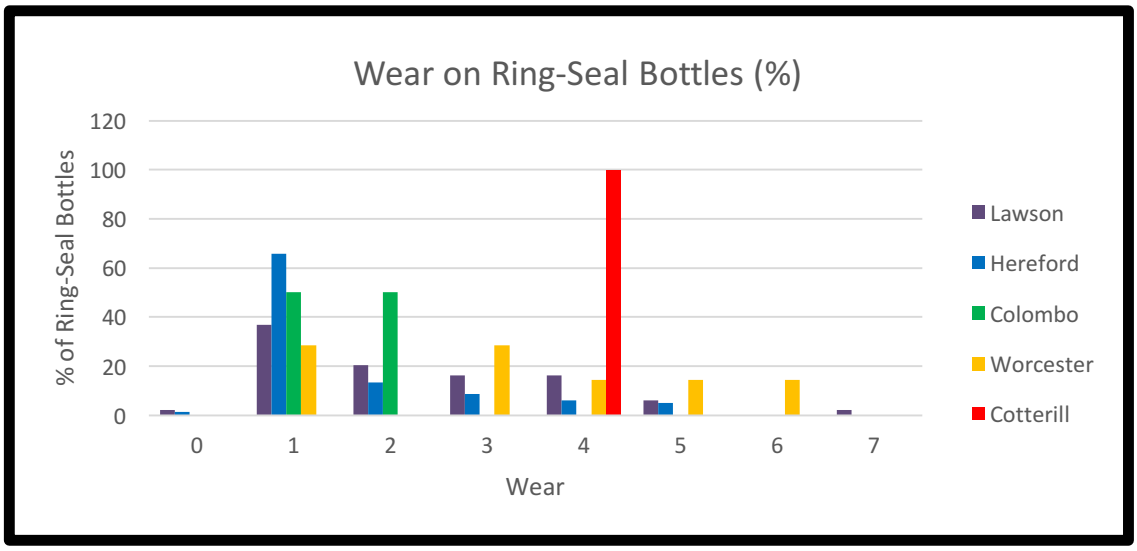


Figure 66: Frequency of Wear on Ring-Seal (Percentage of Ring-Seal Bottles per Assemblage)

Lawson Street had the highest UWI score with 2.0% having the maximum possible score of 7. Lawson Street is also widely spread across the use wear range with scores in every bracket except 6.0-6.9. However, the Hereford Street brewery/warehouse and the Worcester Street domestic site are also widely spread but it is important to consider the small number of ring-seal bottles in the Worcester Street assemblage and therefore these results suggest that use wear on ring-seal bottles was higher in a bottle exchange environment. It also suggests that the Hereford Street brewery/warehouse mainly stored and sold products in recycled ring-seal bottles.

6.4.3: Case Gin Bottles

When compared with the alcohol bottles above (black beer & ring-seal), the amount of case gin bottles is very limited. The Worcester Street domestic site had the highest number with 15, however they exhibited low-moderate wear with only one bottle having a score above 3.0. The Cotterill Street domestic site on the other hand yielded only six case gin bottles but three of them showed extensive wear with a score of 5.0-5.9. The Lawson Street bottle exchange had the highest proportion in the 1.0-1.9 bin but only two bottles scored greater than 2.0. The Hereford Street warehouse/brewery had the smallest number of case gin bottles as well as the least amount of wear with only one bottle within the 1.0-1.9 score bracket.

Table 6.13: UWI scores per assemblage for Case Gin Bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	0	0	1	1	0
1.0-1.9	1	0	10	9	1
2.0-2.9	0	0	2	4	2
03.0-3.9	0	0	0	1	0
4.0-4.9	0	0	0	0	0
5.0-5.9	0	0	0	0	3
6.0-6.9	0	0	0	0	0
7.0-7.9	0	0	0	0	0
Total	1	0	13	15	6

Figure 67: Frequency of Wear on Case Gin Bottles (Percentage of Case Gin Bottles per Assemblage)

The Cotterill Street domestic assemblage exhibited the highest levels of use wear on case gin bottles with 50% having a score of 5.0-5.9 as well as 33.3% with a score of 2.0-2.9. Worcester Street also exhibited high levels of wear (compared with other sites) with 6.7% having a score of 3.0-3.9. None of the other sites had bottles with a score above 3.0. This indicates that use wear on case gin bottles was higher in household contexts than elsewhere.

6.4.4: Wine/Beer Bottles

Wine/Beer bottles are bottles that do not specify what their original contents were – they may have held either wine or beer. The Colombo Street pub had the most of these types of bottles with 28 in total. These all exhibited low to moderate levels of wear with no bottle over a UWI score of 5.0. The Lawson Street bottle exchange had similar results with 15 bottles and only one of these had a score of over 5.0. Colombo Street had the highest proportion in each of its score brackets. The Cotterill Street domestic site yielded just one bottle with a moderate wear score of 4.0-4.9 whereas Hereford Street and Worcester Street had no wine/beer bottles.

Table 6.14: UWI scores per assemblage for Wine/Beer Bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	0	0	0	0	0
1.0-1.9	0	11	6	0	0
2.0-2.9	0	9	6	0	0
03.0-3.9	0	3	1	0	0
4.0-4.9	0	5	1	0	1
5.0-5.9	0	0	1	0	0
6.0-6.9	0	0	0	0	0
7.0-7.9	0	0	0	0	0
Total	0	28	15	0	1

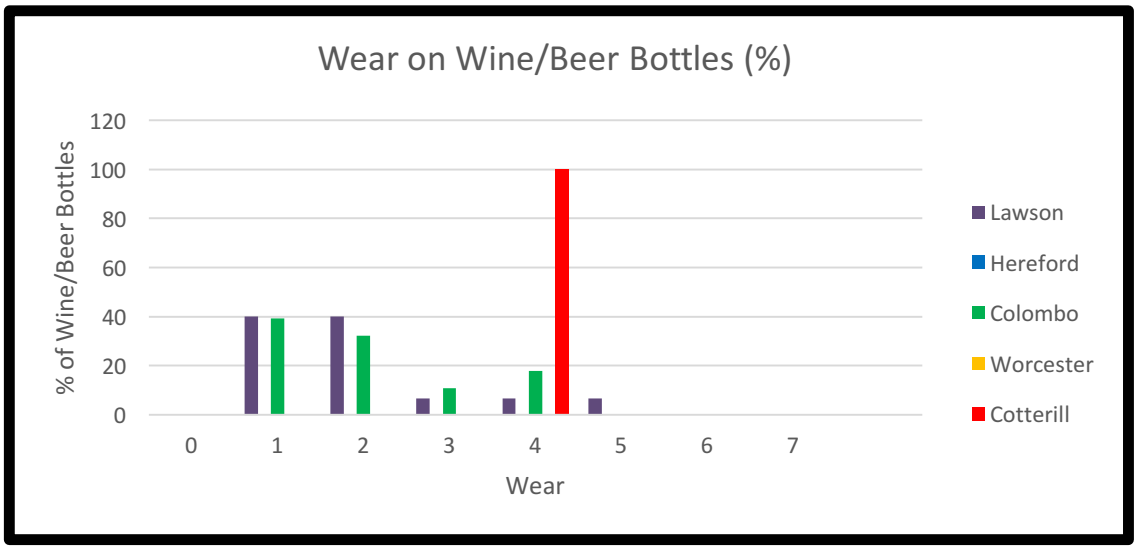


Figure 68: Frequency of Wear on Wine/Beer Bottles (Percentage of Wine/Beer Bottles per Assemblage)

As shown in Figure 68, the Colombo Street pub and the Lawson Street bottle exchange exhibited very similar results. Both are widely spread but Lawson Street had 6.7% of its wine/beer bottles with a score of 5.0-5.9 thereby making it the site with the highest level of use wear. Being a bottle exchange business, it is not surprising that Lawson Street had a large range of these bottles and exhibited higher levels of use wear.

6.4.5: Other Wine Bottles

There was a low number of wine bottles found with only two sites yielding them in their assemblages: the Hereford Street warehouse/brewery and the Lawson Street bottle exchange. Lawson Street had the highest number with 30 bottles while Hereford Street only yielded one which was in the 1.0-1.9 UWI score bracket thereby displaying low wear. Lawson Street exhibited extensive wear with bottles in every score bracket except for 0.0-0.9.

Table 6.15: UWI scores per assemblage for Other Wine Bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	0	0	0	0	0
1.0-1.9	1	0	14	0	0
2.0-2.9	0	0	5	0	0
03.0-3.9	0	0	6	0	0
4.0-4.9	0	0	2	0	0
5.0-5.9	0	0	1	0	0
6.0-6.9	0	0	1	0	0
7.0-7.9	0	0	1	0	0
Total	1	0	30	0	0

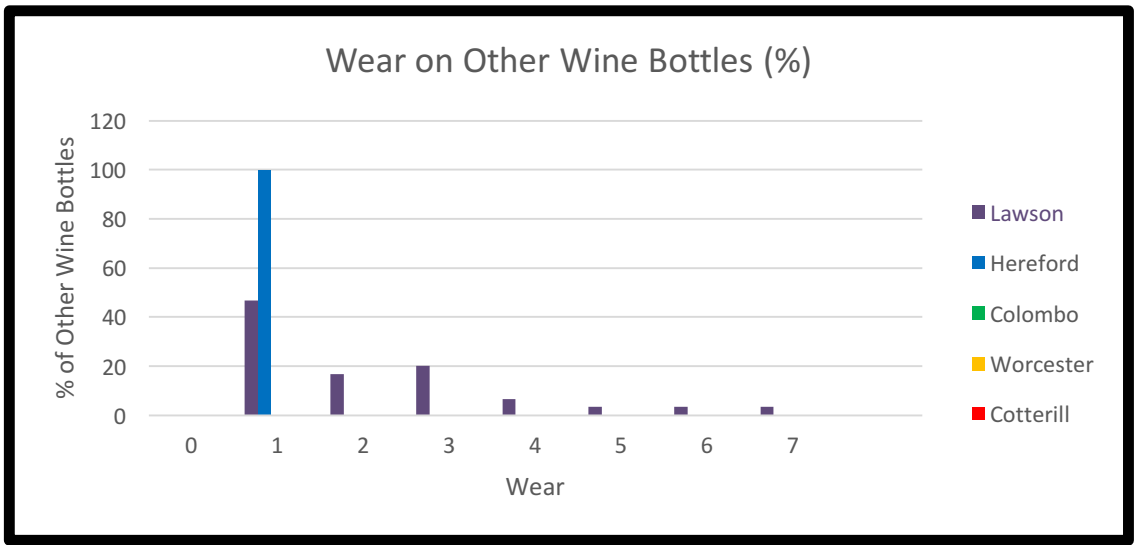


Figure 69: Frequency of Wear on Other Wine Bottles (Percentage of Other Wine Bottles per Assemblage)

As shown in Figure 69, the Lawson Street bottle exchange is widely spread with bottles in every bin except for 0.0-0.9. Lawson Street exhibited 3.3% with the maximum possible score of 7.0 as well as having bottles in the next two highest score brackets of 6.0-6.9 and 5.0-5.9. Hereford Street does have 100% in the 1.0-1.9 score bracket however this proportion value is misleading as it is represented by only one bottle. This reveals that use wear on other wine bottles was higher in the bottle exchange business.

6.4.6: Other Beer Bottles

Three sites yielded other beer bottles in their assemblages - the Hereford Street brewery/warehouse, the Lawson Street bottle exchange and the Worcester Street domestic site. These bottles showed only low-moderate levels of wear with just one bottle having a score above 5.0. The Hereford Street brewery had the highest proportion (6) in the 1.0-1.9 bin whereas Lawson Street had the highest (2) in the 2.0-2.9 bin. Worcester Street yielded only one bottle which had a score of 3.0-3.9 whereas both Lawson Street and Hereford Street had six other beer bottles each.

Table 6.16: UWI scores per assemblage for Other Beer Bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	0	0	0	0	0
1.0-1.9	6	0	2	0	0
2.0-2.9	0	0	2	0	0
03.0-3.9	0	0	1	1	0
4.0-4.9	0	0	0	0	0
5.0-5.9	0	0	1	0	0
6.0-6.9	0	0	0	0	0
7.0-7.9	0	0	0	0	0
Total	6	0	6	1	0

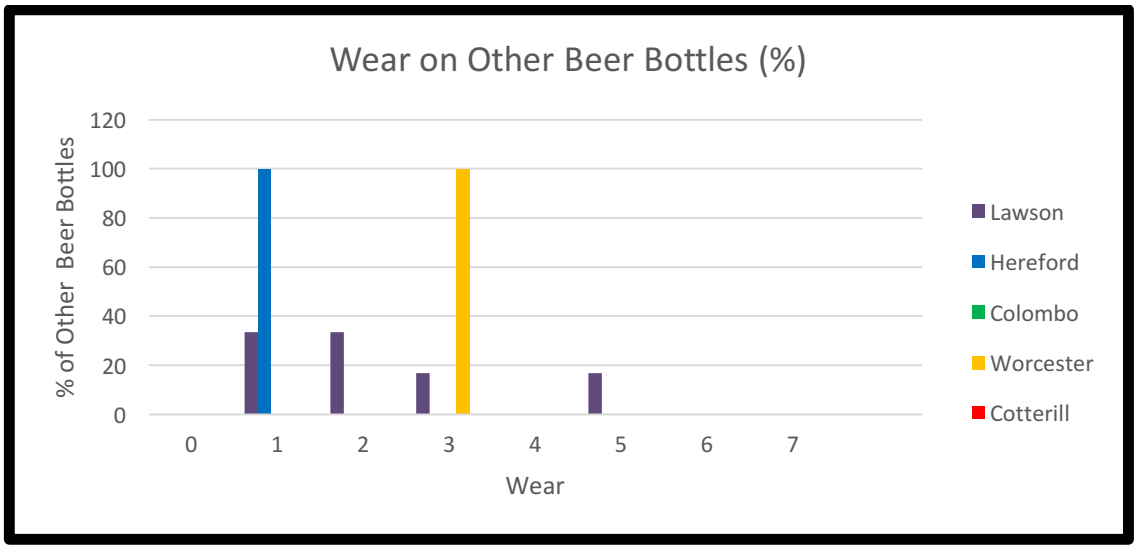


Figure 70: Frequency of Wear on Other Beer Bottles (Percentage of Other Beer Bottles per Assemblage)

With sample sizes less than 10, percentage values for all assemblages are not especially meaningful. Nonetheless, the Lawson Street bottle exchange assemblage

exhibited the highest levels of use wear on other beer bottles with 16.7% having a score of 5.0-5.9. The bottles from this site were more widely spread across the use wear range than elsewhere. This would again suggest that use wear on other beer bottles was higher in the bottle exchange business.

6.5.7: Other Spirit Bottles

There were small quantities of spirit bottles found in every site except for Hereford Street which yielded 32 bottles. All had low-moderate evidence of wear with none of the bottles scoring a UWI of over 5.0. The Hereford Street warehouse had the highest proportion in the 1.0-1.9 bin (31) while the Worcester Street domestic site had the highest proportion in the 2.0-2.9 bin (8). Worcester Street and the Lawson Street bottle exchange were the only sites with bottles in the 4.0-4.9 bin and therefore displayed more extensive wear than the other sites.

Table 6.17: UWI scores per assemblage for Other Spirit Bottles

Bin	*Hereford*	*Colombo*	*Lawson*	*Worcester*	*Cotterill*
0.0-0.9	0	0	0	0	0
1.0-1.9	31	1	5	3	1
2.0-2.9	1	0	1	8	0
3.0-3.9	0	2	1	1	0
4.0-4.9	0	0	1	1	0
5.0-5.9	0	0	0	0	0
6.0-6.9	0	0	0	0	0
7.0-7.9	0	0	0	0	0
Total	32	3	8	13	1

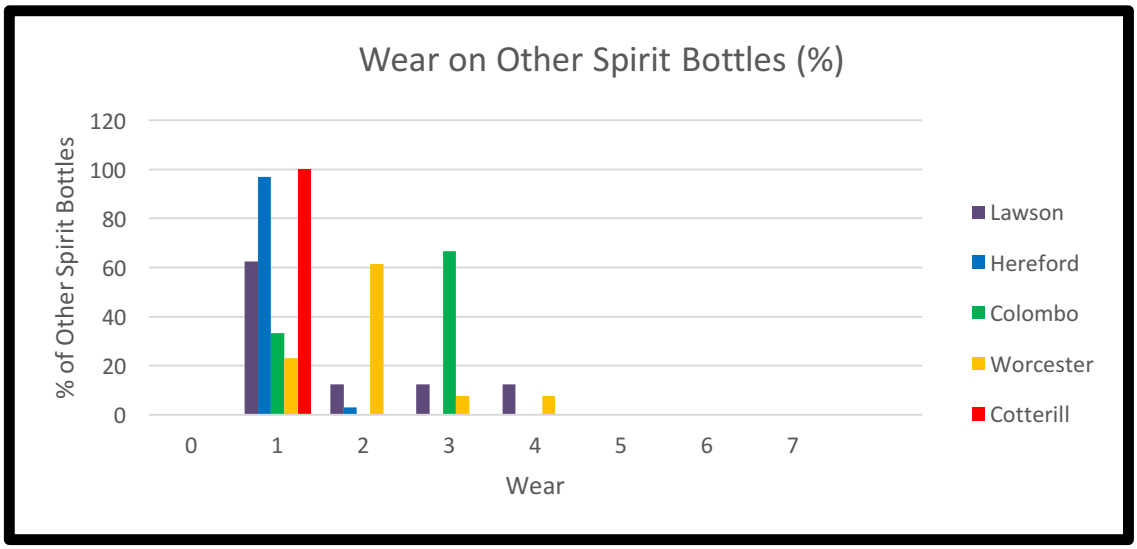


Figure 71: Frequency of Wear on Other Spirit Bottles (Percentage of Other Spirit Bottles per Assemblage)

As shown in Figure 71, none of the sites exhibited extensive wear on their other spirit bottles, with nothing above the 4.0-4.9 score bracket, and just two sites yielded this highest use wear score. The Worcester Street domestic site had 7.7% and the Lawson Street bottle exchange had 12.5% within the 4.0-4.9 score bracket. The spirit bottles from these sites were more widely spread than elsewhere. The Colombo Street pub yielded 66.7% with a score of 3.0-3.9, however, with only two spirit bottles in this assemblage, proportional values are quite misleading. This applies also to the solo bottle from the Cotterill Street domestic site which gave a 100% value in the 1.0-1.9 bin. The Hereford Street warehouse also has a high proportion of 96.8% in the 1.0-1.9 bin but this is represented by 31 bottles. Figure 71 and Table 6.17 indicate that use wear on spirit bottles was generally higher in household contexts with the bottle exchange business a close second.

This section has shown that black beer bottles were the most common type of alcohol bottle in 19th century Christchurch but there was more evidence of use wear on ring-seal bottles. It also reveals that the alcohol bottles from the bottle exchange had higher levels of wear than those from the other sites. However, the alcohol bottles from the domestic sites, especially Worcester Street, had the second most extensive levels of wear and, taking the results from the other types of bottles into account, use wear on bottles was higher in household contexts.

Chapter 7: Discussion

This chapter places the results from the previous chapter into a wider context in order to provide explanations for observed patterns in the data as well as interpretations of the activities that occurred within the different contexts to produce the level of wear. These findings will lead towards a broader interpretation of the daily social life of Victorian Christchurch with specific interest in the drinking culture of the time.

In this study bottles were grouped into functional categories reflecting their presumed original contents based upon bottle shape. The first question that needs to be considered is how robust these categories are, given that bottles may have been reused and refilled with different liquids than what was originally intended. Standardisation of bottle shapes occurred during the gradual mechanisation of bottle manufacture during the nineteenth century, in part to assist in differentiating between the many different kinds of products that bottles could contain, and to help manufacturers of these products recover their bottles for refilling and reuse (Baugher-Perlin 1982). However, archaeological sites do contain bottles that retain paper labels showing that during their last use they contained a different product than would be expected from the bottle's shape. For example, Jones (1986) has shown that the cylindrical 'black' glass bottles commonly used for beer or spirits sometimes contained wine, cider, vinegar, spa water or castor oil, and in New Zealand, champagne-style 'ring-seal' bottles were typically used for beer or wine but have also been found with labels for ginger ale and lemonade (Bedford 1986; Petchey 2002).

However, analysis of large assemblages of bottles with paper labels suggests that, at least in some contexts, reuse for different functions was the exception rather than the rule. For example, the Wanganui Hotel yielded 245 bottles with surviving paper labels (Harris 2009). All squat and some tall black beer bottles had labels showing that they held beer of various types including India Pale Ale and Porter/Stout (branded Parsloe & Curran and Robert Porter & Co). There were also some champagne labels found, most commonly from Deinhard & Co, and the seven bottles

with this label were ring-seal champagne bottles (Harris 2009). Most of the spirit bottles found with labels intact were Old Tom Gin and produced by various companies, such as Bernard & Co and Sir Robert Burnett & Co. from England. In addition to gin bottles, whiskey and cognac bottles were also discovered at this site. The known whiskey company was James Mackenzie from Glasgow whereas the cognac companies were Hennessy & Co and J. Freych. While the whiskey and gin bottles were aqua coloured and were typical of spirit bottles, the cognac bottles were green ring-seal wine bottles (Harris 2009). This does not go against the assumption that ring-seal bottles were used for wine as cognac is a type of distilled wine and is therefore suitable for ring-seal bottles.

A similar, although smaller, sample of labels was recovered from the Avon Bond store, part of the Hereford St site that was analysed in this study. There were several bottles that had legible labels. Two Bordeaux-shaped wine bottles had white/orange labels that read …AU DU…. / ALTMA[I?]N BEU…./ ….BORDEAUX…. These were Chateau Duluc labels and probably contained a claret wine. Another, that was morphologically a spirit bottle, had a red/yellow/blue label with OLD TOM GIN written on it. In 1873 and 1876, Wood, Shand & Co advertised the selling of both Old Tom Gin and Chateau Duluc charet wine (*Press* 3/11/1873; 14/10/1876) thus demonstrating that the assumed use for these bottles is correct.

While both these examples provide some confidence about the general presumption that bottle function can be inferred from bottle form, the results of the present study suggest that the situation was more complex. Data presented in Chapter 6 showed that the extent to which bottles were reused varied between different bottle-use contexts and between different bottle types, indicating that both these factors need to be considered when making interpretations of human behaviour from bottle assemblages.

7.1: Variation in Use wear by Context

The amount of use wear on a bottle changes depending on the different activities that occurred at the different sites. According to Woff (2014), the use of context in the interpretations of bottles and sites is important for the validity of these interpretations. This section will determine what site or context had the most wear and therefore reused bottles most frequently and this will help in discovering what activities occurred at each context.

To facilitate comparisons between sites the UWI scores presented in Chapter 6 were simplified by grouping them into three categories. Bottles with UWI scores ranging from 0.0 to 1.9 were classified as having low wear, those with UWI scores from 2.0 to 4.9 were classified as having moderate wear, and those with UWI scores from 5.0 to 7.9 were classified as having high wear. A use wear profile was then determined for each site by calculating the percentage of bottles assigned to each level of wear (Table 7.1, Figure 72).

Table 7.1: Glass vessel Use wear profiles (All contexts), showing % of vessels assigned to three levels of wear

Level of wear	Hereford	Colombo	Lawson	Worcester	Cotterill
low (0-1.9)	87	47	58	47	73
moderate (2-4.9)	11	49	37	48	18
high (5-7.9)	2	4	5	5	9
N vessels	325	234	355	163	71

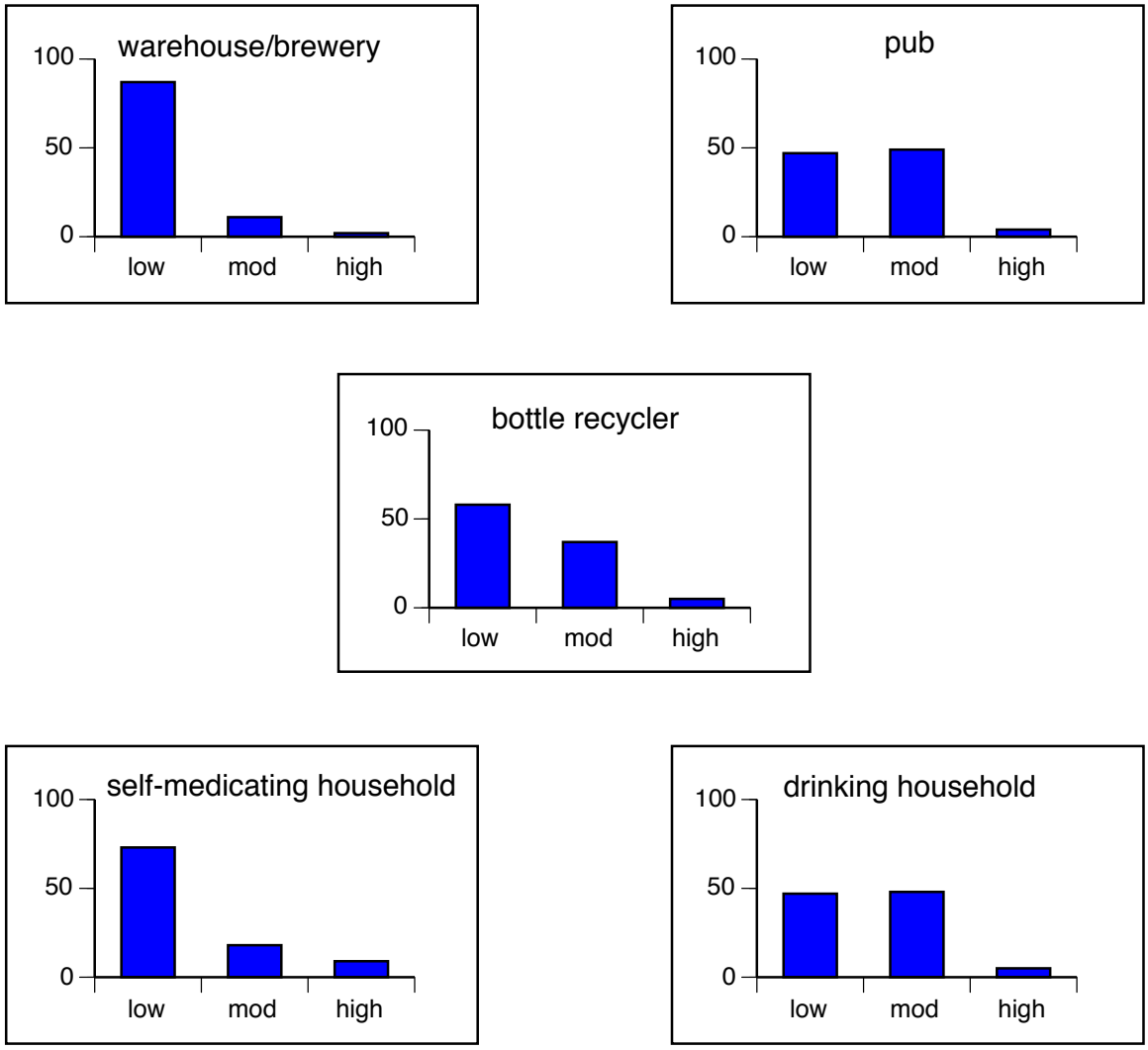


Figure 72: Wear Profiles of Assemblages (All contexts)

7.1.1: Brewery/Warehouse Context

The Hereford St warehouse/brewery site had the lowest wear profile. It had the highest percentage of all bottles with a low UWI score and the lowest numbers with moderate and high scores (Table 7.1 & Figure 72). This is exactly what you would expect from a place which, as a warehouse, would have purchased bottled products direct from international manufacturers, and as a brewery might have sourced some of its bottles direct from glass manufacturers. However, a brewery would also have purchased empties from bottle recyclers and this would be expected to have

produced more wear than the low scores that were found on most of the bottles at this site. This may suggest that the Hereford St assemblage was more a product of warehouse activity than of the brewery operations there, which correlates to the evidence found in the primary sources. According to the archaeological evidence as well as the primary evidence, the Avon Bond store was more a warehouse where imported items, mainly alcohol, were stored and sold (Garland et al 2014; *Press* 3/11/1873; 19/10/1876; 9/05/1877; 22/10/1880; *Star* 22/05/1876; Figure 73). The material that was excavated and analysed at this site was unwanted or damaged stock, therefore, the only two activities that occurred here were transport and storage.

WOOD, SHAND, AND CO.

HAVE ON SALE:

Acid, tartaric, in jars
Arrowroot, W. I., in tins
Baking powder, Borwick's
Buckets
Buckets, galvanised iron, 11, 12, 13-inch
Buckets, galvanised, hooped stable
Beehives, Neighbour's patent
Bitters, orange British
Blacklead, Nixey's, 1, 2, and 4 ozs.
Blacking, D. and M., paste and bottles
Blue, Colman's pale and dark
Bathbricks
Barley, prepared
Candles, Brandon's, 11b.
Capers, C. and B., ½-pints
Carb. soda, kegs
Candied peel, assorted, Keiller's
Confectionery, assorted, Keiller's
Chocolate, Fry's
Cigars, Swiss, H. S. Manillas
Cigars, real Havannahs
Corn flour, B, and P.
Cornsacks, F. W.
Clothes' pegs, American
Clothes' lines, assorted sizes
Cordage, assorted sizes
Cream of tartar, in jars
Corks, white velvet wine
Curry powder, C. and B.
Condiments, ½-pints
Currants, fine new fruit, in barrels and cases
Cloves, whole, Zanzibar
Raisins, sultanas
Eau de Cologne
Epsom salts
Herrings, red, in tins
Herrings, salt, in ½-barrels
Herrings, fresh, in 11b tins
Lobsters, Morton's, 11bs
Ling, 1 cwt cases
Ginger, bleached and ground
Groats, Robinson's patent
Hops, Tasmanian
Hops, English, Kent
Ink, miniature writing
Jams, Tasmanian, assorted
Knife polish
Maccaroni
Maraschino, qts and pints
Marmalade, Keiller's, 11b
Matches, B. and B. plaids
Matches, 250s and 1000s
Matches, B. and M. P. safety
Milk pans, seamless, 20, 22, and 24-inch
Mustard, Colman's Durham superior and D. S. F.
Nuts, Barcelona
Nutmegs, first quality
Oils, castor, ½-pints
Oils, castor, drums
Oils, linseed, boiled and raw
Oiils, colza, in drums
Oils, salad, Whybrow's and Morton's
Oils, C. and B., pints and ½-pints
Oils, kerosene
Oatmeal, colonial
Painkiller
Patent driers
White lead, various
Paperhangings, assorted, in bales
Paper bags, assorted sizes
Paper, tea
Paper, sugar
Paper, brown wrapping
Paper, double wrapping
Pickles, red cabbage
Pimento, whole
Ploughs, double furrow, by G. W. Murray and Co., Banff
Rice, Rangoon, Java, Carolina
Rennets, dry salted, in jars
Sago, small and large, in chests
Salt, coarse and fine
Salt, table, in jars
Saltpetre, ground, lump
Sauces, L. and Perrin's
Sauces, tomato
Soap, Cleaver's assorted bars
Soap, Cleaver's assorted tablets
Soap, Cleaver's brown Windsor
Soap, colonial
Soap, soft, English
Soap powder
Soda crystals
Spices, mixed, in fancy boxes
Starch, white and blue
Stout, Guinness's, in hhds

SPIRITS—Brandy, C.V.P., dark and pale, qr-casks
Brandy, C.V.P., dark and pale, case
Brandy, Hennessy's pale, in qr-casks
Brandy, Hennessy's case, 1 star
Brandy, Hennessy's case, 3 star
Brandy, Martell's brown, 1869
Old Tom, Sir R. Burnett's, in case
Old Tom, Sir R. Burnett's, colorless, in qr-casks
Old Tom, Swaine, Boord's, in case
Rum, Lownde's, 10 to 30 o.p.
Rum, Lemon Harts, 10 to 30 o.p.
Rum, vatted
Whisky, Jamieson's old Irish
Whisky, Dunville's old Irish
Whisky, Campbleton Scotch
Whisky, Long John, Scotch
Geneva, J.D.K.Z., red and green case
Geneva, V.H. and C., high proof

Sugar, crushed loaf, English, in 1 and 2 cwt.
Sugar, crushed loaf, Dutch, in 1 and 2 cwt.
Sugar, Mauritius, finest white counter
Sugar, Mauritius, finest dry crystal
Tapioca, in barrels and tins

TEA—In chests, hf-chests, and qr-chests
Medium to fine congou
Extra strong black congou
Flavoring strong black congou
S.O.P. and gunpowder
New season's congou S.O.P., and gunpowder, just landed

Treacle, in 1 cwt kegs
Tobacco, St Andrew's twist
Barrett's 10's
Barrett's light and dark 5's
Mount Bernard's, 10's
Turpentine, spirits of, in drums
Twine, assorted in cases
Vermicelli, in boxes
Vinegar, Burnett's brown malt, in hf-hhds and cases

WINES—Sherry, in qr-casks, 1, 2, 3, 4, dry pale and Amontillado
Port, Carey's 3 grape
Port, Graham's, all qualities
Claret, Prellar's
Claret, St Estephe
Champagne, Roederer's, quarts and pints
Champagne, Hadsuck's first quality, quarts and pints
Moselle, Demhard's, No 2 quality, quarts and pints
Hock, long and squab
White Burgundy
Hermitage
Mersault
Woolpacks, F. W.

Hereford street, November 3rd, 1873.

Figure 73: Newspaper Advertisement for Wood, Shand & Co with a list of imported items on sale (Press 3/11/1873)

Out of the alcohol bottles that were found, 87% had a low wear score (0.0-1.9) while only five bottles had a score above 5.0 as shown in Table 6.2 and Figure 56. This proves that they did not rely greatly on second hand bottles from bottle recyclers but rather purchased full bottles directly from international manufacturers. It also indicates that the low levels of wear probably were a result of rough transportation or standing in a crate for an extended period of time. Some bottles could remain in these warehouses for months, or even years, prior to sale or disposal (Woff 2014).

The two alcohol bottle types (Table 6.10 & Figure 64) that occurred most frequently at the Hereford St warehouse site were black 'beer' bottles (62.1%) and ring-seal bottles (25.4%). Black 'beer' bottles were extremely common, however, most had low wear with 186 out of 200 having a score of under 2.0 (Table 6.11 & Figure 65). In comparison, the ring-seal bottles were less common but had more wear with over 30% having a score above 2.0 (Table 6.12 & Figure 66). This suggests that a small number of the ring-seal bottles, stored at the site, could have been recycled before being refilled by international manufacturers. However, most exhibited low wear and therefore were unlikely to be second hand.

Only three glass vessels from this site were not alcohol bottles. They consisted of two pharmaceutical bottles and one condiment bottle. They exhibited low wear and contributed to the 87% of the overall bottles with a low level of wear (Table 7.1). This, in turn, rendered the warehouse the context with the lowest wear profile overall.

7.1.2: Pub Context

In contrast to the Hereford St. warehouse site, the Oxford Hotel in Colombo St has a much higher wear profile. More than half the items in the assemblage had moderate to high UWI scores (Figure 72). Most of these were alcohol bottles and glassware. The table-ware exhibited most wear, with almost half displaying a score above 4.0 (Table 6.4 & Figure 58) while almost half of the alcohol bottles had moderate levels of wear (Table 6.2 & Figure 56). This fits with its archaeological context, as a pub would have had countless bottles going around and around the reuse cycle and the

glassware would have been used and reused frequently. With most of the Colombo St. bottles in the alcohol category, it can be reliably assumed that these particular bottles were actually filled with contents that matched their type.

The other bottle types that were found at this site consisted of condiment, non-alcohol and pharmaceutical bottles. However, there was very limited wear on these which would indicate that they were not reused as frequently as the alcohol bottles and glass tableware. This suggests that drinking alcohol was the main activity that occurred at this pub/hotel. Black 'beer' bottles were the most common bottle type used at the Oxford Hotel making up 82% of the total of alcohol bottles. (Table 6.10 & Figure 64). Having been found in a pub setting, it is likely that most held alcohol. They commonly contained beer or spirits such as whiskey or gin (Lindsey 2017). Furthermore, the main type of glass tableware found at this site was tumblers which were mainly used for spirits (Woff 2014). Therefore, it is likely that spirits, such as whiskey, were the main type of alcohol consumed at the Oxford Hotel. This is supported by Christchurch newspapers where the array of spirits that were sold at the Oxford Hotel was advertised (*Star* 28/12/1876; 19/06/1877; Figures 74 & 75).

Although spirits were common due to their high alcohol content, it is worth noting that beer was also consumed at this establishment, but not in the same quantities (*Lyttelton Times* 23/8/1862). Black beer bottles were reused frequently as there were bottles in every score bracket except for 0.0-0.9 and 7.0-7.9 (Table 6.11 & Figure 65). However, the pub context did not display the most wear overall. The highest wear profile belongs to the Worcester St domestic site which will be examined below. This is not surprising because pubs would have had large numbers of bottles that had been recycled. Bottles in pubs/hotel settings would have been used quickly whereas, in a household, the same bottle may have stayed in use for many years. In addition, pubs would have had relatively high levels of breakage, which would take the bottles out of the reuse cycle, and they would also have had a constant influx of new bottles with low levels of wear.

THE OXFORD HOTEL.

CHRISTMAS CAROL!

ALL you who at CHRISTMAS intend to be merry,
On Brandy, or Gin, Rum, Port, Whiskey, or Sherry,
Or on ANNIVERSARY DAY and NEW YEAR
Eat OLD ENGLISH ROAST BEEF, with a bumper of BEER!

Come and taste at the OXFORD! Then find, if you can,
Any better to drink than the liquors of DANN!!
HENNESSY'S STAR Pale Brandy, all others that licks,
You get at, per bottle, FIVE SHILLINGS AND SIX!

SWAINE BOORD'S Old Tom, good hot when going to bed,
FOUR BOB; FOUR AND SIX for the J.D.K.Z.!
DUNVILLE'S Whiskey, FOUR SHILLINGS; LORNE, FOUR AND A HALF,
Guaranteed to make even a Presbyter laugh!

PORT wine, drinking which all the doctors agree,
Will cure sick men far surer than paying their fee!
And that all animosity Christmas may bury,
It's also FIVE BOB for a bottle of SHERRY!

Then, after Roast Beef, what's your PUDDING of PLUM,
Unless wreathed in blue blazes of BRANDY or RUM?
And what does ripe Cheese and fresh Salad avail,
Without creamy Brown Porter, or good foaming Ale?

With a young sucking PIG, try our PIG brand of STOUT,
Or uncork our good BLOOD, or our GUINNESS pour out;
Or that TURKEY down hill may more easily pass,
From the OXFORD take home a few bottles of BASS!

Whatever the liquor you wish for, HOST DANN
Will supply you with all that the best cellar can;
Fill your Christmas bowl up from the OXFORD HOTEL,
Near the new TOWER built for the old FIRE-BELL!!!

Figure 74: Newspaper Advertisement with a list of alcohol beverages within a Christmas Carol (Star 28/12/1876)

THE GOVERNOR'S VISIT.

OXFORD HOTEL.

The MARQUIS has opened Museum and College,
Thus doing due honour to study and knowledge;
But GEORGE M. DANN, scared lest the Russians should thwack us,
Has opened his fire in honour of Bacchus!

The Danube has stopped the supplies by o'erflowing,
But DANN, U BE sure, for such rise is too knowing;
His army of customers, Cossacks or others,
To th' OXFORD yet stand well-affected as brothers!

Like BISMARCK the Prince, DANN has thought of retiring:
But NORMANBY, greatly his liquors admiring,
And fearing lest Christchurch should want of good cheer,
Like an Emperor, bade DANN give up the idea!

Has VON HAAST got anywhere in the Museum
Drink specimens good as elsewhere you can see 'em?
DANN has at the OXFORD! To any who need it
The catalogue's gratis,—below they may read it!

Have the GOVERNORS got in their suckling College
Professors of TASTE in convivial knowledge?
Let the bunch of them, science with jollity linking,
Imbibe at the OXFORD, and lecture on drinking!

Come, Governors, whether of College or Colony,
And Doctor Von Haast! If you wish to be scholarly,
Drop all scientific and teachers' diversity!
Affiliate to DANN'S CORK University!

Hennessy's ◁▷ P.B., 5s 6d; Martell's *** Dark, 7s 6d; Lorne and Dalmore Whisky, 4s 6d; Dunville's, 4s; Old Tom, 4s; J. D. K. Z., 4s 6d; Dry Gin, 4s; Port Wine, 5s; Dark and Pale Sherry, 5s; English Stout and Ale, 2s 6d for Two Bottles. 2169

Figure 75: Newspaper Advertisement with a list of alcohol beverages sold at Oxford Hotel (Star 16/07/1877)

7.1.3: Bottle Exchange Context

The bottle exchange located on Lawson Street has a wear profile between the two other commercial enterprises. It has more than half with low UWI scores, more than a third at moderate levels and more in the high category than either of the others from the commercial sector (Figure 72). This makes sense because a large part of their business would have involved acquiring bottles that were last used in pubs/hotels, liquor/grog stores and warehouses. However, they would also have been purchasing from households and that is probably where the higher wear items came from because the proportion of vessels with high wear is at that level or higher in the two household assemblages.

According to Table 6.1 & Figure 55, the bottle exchange held a variety of bottle types in its possession but most of the bottles discovered at the site were alcohol and pharmaceutical. The small proportions of non-alcohol bottles, household bottles, condiment, tableware, food-related bottles and personal bottles indicate that they made up only a small part of the bottle exchange business whereas alcohol was the major part. This is confirmed due to the high level of wear that is shown on the alcohol bottles with two of them having the maximum possible score of 7. It should be noted that the Lawson St bottle exchange was the only context that yielded a score of 7. Table 6.2 and Figure 56 reveal that Lawson Street had the most wear on alcohol bottles overall as they were more widely spread across the use wear range with bottles in every score bracket. Sixteen bottles yielded a score above 5.0, a large amount when compared to the other sites. Although pharmaceutical bottles appear to represent a large proportion of the bottle exchange business, the level of use wear suggests otherwise with 62 out of 66 of these bottles having a score under 2.0 (Table 6.3 & Figure 57). This is also true of most of the other categories with the exception of non-alcohol. No bottles in the glass tableware, household, and personal categories and only one in both the food-related and condiment categories achieved a score above 2.0. Therefore, 40 out of 42 of these bottles were in the low wear profile. Non-alcohol vessels, however, exhibited moderate levels of wear with six bottles having a score between 2.0 and 5.0 as well as one bottle with a score above 5.0 (Table 6.5 & Figure 59). This still does not compare with the levels on the alcohol

vessels and means that they were the predominant bottles used in the bottle exchange due to their large numbers and extensive wear.

The alcohol types, black 'beer' (46.3%) and ring-seal bottles (21.2%) produced both large numbers and extensive wear with one ring-seal bottle having the highest possible score (Table 6.10 & Figure 64). Black 'beer' bottles had 70 out of 107 (65%) with a score above 2.0 whereas ring-seal bottles had 30 out of 49 (61%) (Tables 6.11, 6.12 & Figure 65, 66). 'Wine bottles' was the other bottle type with extensive wear as one of them also had the maximum score of 7 (12.9%). Moreover, 16 wine bottles out of 30 (53%) had a score above 2.0 meaning that more of these bottles had moderate to high levels of wear (Table 6.15 & Figure 69).

The whole process of collecting the bottles, washing them, storing them in crates and then selling them would have involved multiple actions and a large amount of movement in crates. The bottles would have picked up some wear during this process. Nonetheless, it is important to mention that these bottles obviously acquired the more extensive levels of wear elsewhere. Due to the amount of wear on certain bottles, it is probable that some came from household environments before being sold to John Snell (owner of the Lawson St bottle exchange). Unfortunately, it is difficult to determine exactly where the bottles acquired the wear since it was common for bottles to be reused 20-30 times (Woff 2014). Therefore, with the exception of embossed bottles, there is a distinct possibility that they were not returned to the same place each time after being cleaned. Nonetheless, the results do show that Snell worked with reused/recycled alcohol bottles the majority of the time. This is surprising as the advertisements for Snell's bottle exchange do not specify the type of bottles he wanted to obtain, however, certain alcohol bottles, such as ring-seal and black 'beer', were ideal for reuse (*Star* 11/09/1891; 22/11/1892; 29/06/1901).

7.1.4: Household Context

In 1874, there were 14,270 inhabitants in Christchurch, including Kaiapoi and Lyttelton (1874 Census). Most houses were in the inner city (within the four town belts). However, large rural sections, such as Sydenham and St. Albans, were subdivided and sold off. Most became working class areas (Sydenham did have a couple of upper class houses) whereas the elite lived in Merivale, Riccarton and Opawa (Wilson 2012). Two household sites (Worcester Street and Cotterill Street) were analysed in this study. Both assemblages came from rubbish pits dated within the Victorian era. One is from the inner city (Worcester Street) and the other from Sydenham (Cotterill Street). The households can be categorised as a drinking house (Worcester Street), dominated by alcohol bottles followed by those for non-alcoholic drinks, and a self-medicating household (Cotterill Street) where there were three pharmaceutical bottles for every two alcohol bottles.

Drinking household

The drinking household (Worcester St site) has a profile that matches the pub almost exactly, differing only in having slightly more bottles with high levels of wear (Figure 72 & Table 7.1). The bottles from Worcester St displayed extensive wear and often produced the biggest score compared to the other sites. Overall, alcohol and table-ware were the only categories where Worcester St did not have the highest score. Alcohol was second with two bottles in the 6.0-6.9 score bracket. Table-ware yielded the smallest number of vessels here compared with the other sites, apart from Hereford which had none (Tables 6.2, 6.4 & Figures 56 & 58). This suggests that the Prickett household, who inhabited the 272 Worcester Street site in 1888 and onwards, and the Ormandy household, who occupied the 274-276 Worcester Street site around 1863 until the 20th century, reused a range of bottle types (Habbberfield- Short 2016). It is possible that they realised the value of glass bottles and how useful they could be rather than disposing of them after a single use (Woff 2014).

The number of alcohol bottles found at this site (Table 6.2 & Figure 56) indicates drinking was a regular occurrence. The majority of these alcohol bottles are black 'beer' bottles and over half had moderate to high levels of wear (Table 6.11 & Figure 65). Case gin (Table 6.13 & Figure 67) and spirit bottles (Table 6.17 & Figure 71) were the other common alcohol bottles within this assemblage. While there were low levels of wear on case gin bottles, most of the other spirit bottles had moderate to high levels of wear (10 out of 13 had a score above 2.0). The lack of glass tableware suggests that the household may not have drunk from separate glasses which was a common practice in working class households (Karskens 1999; Woff 2014). According to Woff, it was common practice to share a bottle and one glass (2014).

There was a large amount of wear on some bottles from the non-alcohol categories which included food-related, condiment and non-alcohol bottles. The non-alcohol bottles exhibited low to moderate levels of wear and therefore were not reused as frequently as alcohol bottles (Table 6.5 & Figure 59). Whilst the condiment bottles had low wear levels, both food-related bottles had moderate wear (Tables 6.6, 6.8 & Figures 60 & 62). As both of these were S. Kirkpatrick & Co Jam Jars, it can be certain they were used for food preservation, which was popular in the 19th century and continued throughout the 20th century (Morris 2010).

When compared with the amount of wear in other categories, pharmaceutical bottles and personal bottles from the Worcester Street site have very low wear (pharmaceutical had 1 bottle above a score of 3.0 whereas no personal bottles had a score above 3.0) (Tables 6.3, 6.9 & Figure 57, 63). This shows that they were not reused as frequently as other bottle types, probably due to the fear of contamination. The lack of embossing on the pharmaceutical bottles is surprising, however it is possible that they were filled and refilled with specific prescriptions, which would explain the little wear that is present (Woods 2017).

Self-medicating household

In contrast, the self-medicating household (Cotterill St) has a profile dominated by low-wear scores, influenced predominately by low UWI scores of pharmaceutical bottles (Figure 72). According to Table 6.3 & Figure 57, 26 out of 27 pharmaceutical bottles had a score below 2.0, suggesting that these had lower levels of reuse. However, this household also had the greatest number of vessels with high UWI scores, drawn mainly from the alcohol category along with heavily-used single items from the non-alcohol and tableware. Alcohol and glass tableware displayed the most wear with a tableware vessel having a score of 6.0-6.9, the highest score for a vessel of its kind (Tables 6.2, 6.4 & Figure 56, 58). This household seems to have kept many vessels in use for a long time, so perhaps there might have been some polyfunctionality - reusing bottles for different purposes than originally intended. The location, Sydenham, could also be a factor as Christchurch was the main centre of the temperance movement in the 1880s-1890s and its headquarters was located in Sydenham (Bollinger 1967; Rice 2008). It is likely the Beatties, who occupied the site from 1874 until 1937, did not want to drink large quantities of alcohol because their residence was in an area influenced greatly by the temperance movement. Yet, the type of glassware they used (etched stemware and tumblers) suggests a household in which entertaining guests and the presentation of alcohol occurred (Platts 2016). The wear on these vessels also suggests that they entertained guests regularly and this implies that they likely entertained those who were close friends and family rather than acquaintances or neighbours. It is likely they drank small quantities and then reused the bottles for different purposes.

The high number of pharmaceutical bottles found at Cotterill Street and the low level of wear (17 bottles in the lowest score bracket of 0.0-0.9) indicates a preference for self-medicating and discarding the bottles after consumption (Table 6.3 & Figure 57). The majority of these products were used to treat constipation (California syrup of fig), indigestion, acid reflux (Sir J Murray's fluid magnesia) or rheumatism (Chamberlain's Pain Balm) and they were all used once but over an extended period of time, which would explain the little wear present.

Similarly, the condiment and food-related bottles both have little wear with a couple displaying moderate scores (Tables 6.6, 6.8 & Figures 60 & 62) Cotterill Street did have small numbers of household and personal bottles present in its assemblage. Both personal bottles were in 0.0-0.9 bracket and therefore were not reused, probably due to their embossing (Table 6.9 & Figure 63). They both belonged to Rimmel, and while perfume bottles were sometimes refilled with the same product, this would have been difficult as they originated in Paris or London. These bottles were found complete and it is likely that they were only used once over an extended period of time and then disposed of. Household bottles also had small amounts of wear with both ink bottles within the 1.0-1.9 score bracket indicating that they were either reused with the same product for fear of contamination or they had a long single use life (Table 6.7 & Figure 61).

7.1.5: Summary

Overall, households displayed the most wear due to the variety of activities that occurred in this context. The high levels of wear on a limited number of bottles from the self-medicating household (Cotterill Street domestic site) indicate polyfunctionality or the reuse of bottles for different purposes. The Lawson Street bottle exchange exhibited high levels of wear on alcohol bottles which suggests this was the main part of its business. The drinking household (Worcester St domestic site) and the pub are very similar in their wear profiles, both being dominated by alcohol bottles which implies a large drinking environment in both contexts. The warehouse context has the least wear with 87% of its assemblage having low levels of wear. Throughout all contexts low to moderate levels of wear were more prevalent. Very few extensive wear scores were calculated and most of these came from the household contexts, particularly the self-medicating household and the bottle exchange.

7.2: Variation in Use wear by Functional Category

Due to the lack of glass manufacturing in 19th century New Zealand, bottles were reused constantly and this type of use tends to leave its mark. This is why the use wear index (UWI) was developed as it allows archaeologists to be certain if a bottle was reused rather than assuming so. In this section consideration is given to potential reasons for the variations in UWI scores observed between different functional categories of bottles and between bottle types within one of these categories. To do this a use wear profile was calculated for the bottles in each functional category following the same protocols used in the preceding section. These results will be considered in relation to evidence from other sites in New Zealand and elsewhere, and Woff's (2014) scale of reliability.

Table 7.2: Use wear profiles for glass vessel functional categories, all sites combined (%)

Level of wear	household	pharmacy	food	personal	condiment	alcohol	non-alc	tableware
low	100	89	78	75	69	61	48	39
moderate	0	11	22	25	31	35	46	43
high	0	0	0	0	0	4	6	18
N vessels	18	122	18	8	26	859	46	51

Household

Interestingly, the lowest wear profile is for household bottles, with all recording examples having low UWI scores (Tables 6.7, 7.2 & Figure 61). All of the 18 bottles had scores below 2.0 (Table 6.7 & Figure 61). These were mostly containers for ink, glue, shoe polish or other cleaning products suggesting relatively low levels of reuse for these products. However, some level of caution is needed because only a small number of these bottles was present in the assemblages and only two sites (Cotterill St & Lawson St) yielded household bottles. Most of these items contained potentially dangerous substances and they could have produced some nasty results if used for contents other than the original (Woff 2014). They likely had a single use life.

Pharmaceutical

Pharmaceutical bottles displayed the second lowest levels of wear but the same caution applied to the household bottles is not required with this category. Pharmaceutical was the second largest bottle category and the predominance of low UWI scores and the lack of high ones indicate that these were seldom recycled (Table 7.2). Only four bottles had a wear score above 3.0 and 108 (89%) out of the total of 122 bottles had a low wear score (Tables 6.3, 7.2 & Figure 57). Pharmaceutical bottles could have contained products that may have been harmful such as medicines containing chlorodyne. Chlorodyne was a popular patented medicine sold under various brands in the 19th and early 20th centuries. It contained a dangerous mix of chloroform, morphine and an extract of cannabis. Many pharmaceuticals also contained opium as well as a large amount of alcohol (Norris & Beresford 2011) and therefore could have created disastrous results if a bottle was not cleaned properly and was then filled with liquids for human consumption, as these substances were extremely addictive. Another reason why pharmaceutical bottles were not reused often was because many were embossed and therefore belonged to the manufacturer. It was illegal for these bottles to be reused for products that were not the original contents (Busch 1987; Woff 2014). The little amount of wear on the pharmaceutical bottles was probably due to an extended period of use without refilling as they took a long time to be consumed or they were reused by their original company.

Food-Related

The small samples of food-related bottles also lacked high UWI scores but had some in the moderate category (Table 7.2). This is compatible with the fact that these vessels would mostly have had irregular but long-lasting use in most settings, specifically in the household context. An example of this would be the process of food-preservation. Until the second half of the 20th century, various forms of self-provisioning, including fruit & vegetable preservation, played a significant part in New Zealand households (Morris 2010). Preservation jars such as pickle jars and jam jars would be used again and again after the original contents had been consumed thus explaining the amount of wear in the domestic sites. They were the only sites to have a score above 3.0 on these bottles (Table 6.8 & Figure 62).

Personal

Again, there were a limited number of bottles in the personal category with eight in total. They also lacked high UWI scores although some displayed moderate wear (Table 7.2). Personal bottles usually contained perfume and therefore had irregular and long-lasting use in most settings, especially in households. Perfume bottles were usually petite and were not designed to be refilled. It is more common to find complete perfume bottles than any other type of bottle in archaeological sites in New Zealand and most of those discovered in this study were found intact. It appears that personal bottles were not recycled but rather had a single use life, sometimes long, and were disposed of once emptied.

Condiment

The small amount of condiment bottles also lacked any high UWI scores however, they did have some moderate ones (Table 7.2). Five out of the 10 bottles that had moderate scores were from household contexts, particularly Worcester St, whereas the rest came from the Colombo St pub and the Lawson St bottle exchange (Table 6.6 & Figure 60). Condiment vessels included Worcestershire sauce, salad oil, Champions vinegar and other sauces that would have had irregular but long-lasting use in most settings.

Alcohol

Alcohol was one of the three functional categories that produced higher wear profiles. However, it also had a large proportion of bottles with low wear scores with just under two thirds showing a score under 2.0. More than a third had moderate wear as well as a small percentage with extensive wear (Table 7.2). Indeed, alcohol bottles were the only type in the highest (7-7.9) UWI bin (Table 6.2 & Figure 56). This clearly shows that they were reused much more often than any of the previous categories. Alcohol bottles were strong, versatile and robust and thus could withstand most environments in protecting their contents. Therefore, they were ideal vessels for continuous reuse either for their original contents or for various other types of liquid substances.

Woff defines bottle reuse as the recycling of bottles without modification so that their use-life could be extended. The process by which the bottles were made, filled, used, washed, refilled and reused ensured that bottles were used to their full potential before being discarded. The need for such a system arose from a low return rate by customers, a lack of glass manufacturers and the illegal use of bottles by rival manufacturers. Even though vendors would encourage the return of their bottles for refilling, many manufacturers complained that their bottles were not returned or furthermore were filled with various products and not the product the original owner intended (Woff 2014; Ellis & Woff 2017). In Carney's study based in Australia, wine/beer bottles were also used for paint tint and other alcoholic drinks and commercial labels for vinegar, shoe polish and methylated spirits were found in bottle collectors' books and magazines (Carney 1998). In America, liquor and whiskey bottles were commercially refilled with turpentine, linseed soil and sometimes paint (Busch 1987). Other alcohol bottles, in both America and Australia, are also variously described as containing medications, sauces, pesticide, blackening (shoe polish) and kerosene (Busch 1987; Carney 1998; Lawrence 2006; Woff 2014).

Alcohol bottles are regularly identified as multi-purpose vessels. Both Woff (2014) and Woods (2017) state that alcohol bottles such as ring-seal and black 'beer' bottles should be called generic bottles due to the countless products these bottles can be reused for. Woff (2014) states that wine and beer bottles did have the lowest likelihood of representing the product they last contained. However, studies such as Harris (2009) mention that these bottles were normally used for the assumed contents. Furthermore, only a small portion of the alcohol bottles studied in this thesis had extensive wear (Table 7.2). This indicates only 4% of all alcohol bottles studied were reused extensively and therefore only 4% had a greater chance of being reused for multiple purposes.

Non-Alcoholic Drinks

The results for non-alcoholic drinks demonstrate how popular fizzy drinks and soda water were (and still are). Due to the carbonation, aerated liquids needed good robust bottles - the exact circumstances that would encourage extensive reuse. Just

under half of these had low wear (48%) and almost exactly the same proportion had moderate wear (46%) (Table 7.2). Moreover, the proportion with high wear was almost double that for alcohol (Table 7.2). Mostly 'aerated waters' bottles, these were the most extensively worn bottles across the five assemblages and were clearly recycled the most. The manufacturers of these drinks had their bottles embossed precisely so that they could get their own bottles back, either from customers or via a bottle exchange, in order to recycle them themselves. Examples include but were not limited to H.Mace as well as Lee & Evans. Sometimes, if these bottles were not brought back to their original manufacturer, there could be consequences such as court action (Busch 1987; Woff 2014; Figures 3 & 4). Embossing is evidence of reuse of original contents, however soda water bottles were also uniquely shaped, (Codd's soda bottle is an example), to be able to hold the pressure of aerated liquids. They were typically used for aerated substances and the use wear suggests that these bottles were reused often with the same product each time.

Glass Tableware

The highest levels of wear observed were not found on bottles but on glass tableware. It was the only category with mostly moderate scores (Tables 6.4, 7.2 & Figure 58). Most of these came from the pub assemblage so the result is not surprising (Table 7.2). Interestingly, glass tableware from the drinking household had a lower wear profile than that from the self-medicating household (Table 6.4 & Figure 58). Perhaps the domestic drinkers broke their glasses more quickly before they could build up the use wear, while the self-medicators curated their glassware much more carefully. The expensive etched stem-ware recovered from the self-medicating household makes this plausible. Also, Karskens (1999) and Woff (2014) both mention that it was common for working class people to share one glass at a table with friends while the upper class did not. This would have made breakages more likely to occur as the glassware was being passed around much more frequently. Furthermore, it is known that tumblers and stemware were used for different occasions, for example, stemmed glasses were used at the formal dining table whereas tumblers for more social and unruly occasions (Yasmin 1998; Woff 2014). While the pub and both household contexts yielded tumblers, only the self-

medicating household (Cotterill St) had stemmed glassware. This indicates they mostly drank around the dinner table where breakages were likely to be less common. It also appears that they carefully looked after their glassware over a long period of time, thereby creating more use wear.

Summary

Although household bottles displayed the least amount of wear with all bottles exhibiting low scores, some level of caution is required due to the small number of these bottles. The same cannot be said when considering the pharmaceutical bottles. These were the second largest category of bottle found across the five sites but also yielded predominantly low wear scores (89%) rendering the pharmaceutical bottles the least reused type. The condiment, personal and food-related categories represented small fractions of the assemblages and exhibited low to moderate wear. Therefore, it is likely these bottles had irregular but long- lasting use in most settings. The three functional categories with the highest wear profile, indicating they were reused the most extensively, were alcohol, non-alcohol and glass tableware. The latter displayed the most wear with the highest proportion of extensive, high wear scores (18%) out of all the categories and also revealed a greater percentage of moderate scores (43%) than low (39%).

7.3: Variation in Use wear on alcohol bottles

Due to the predominant number of alcohol bottles as well as the amount of wear they exhibited, it is important to discuss these bottle types in more detail. This section will examine the variation in use wear on alcohol bottles. The bottle types that will be looked at are other spirits, case gin, black 'beer', other beer, ring-seal, other wine and wine/beer bottles. For each the UWI scores were simplified into low, moderate and high categories using the protocol outlined in section 7.1.

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Table 7.3: Use wear profiles for alcohol bottle types, all sites combined

Level of wear	Other spirits	Case gin	Black beer	Other beer	Ring seal	Other wine	Wine/beer
low	72	66	64	62	55	48	39
moderate	28	26	33	31	38	42	59
high	0	8	3	7	7	10	2
N vessels	57	35	531	13	141	31	44

Other Spirits

The lowest wear profile is observed on other spirits with mostly low wear scores (72%) as well as no high scores (Table 7.3). These were predominately gin, whiskey and even flask bottles. They came in various sizes and were colourless, green and sometimes amber in colour. Most of the wear that was recorded on these bottles occurred in the domestic sites, specifically Worcester Street. This site yielded 10 out of 13 bottles with moderate wear (Table 6.17 & Figure 71). The other sites produced mainly low wear scores for this bottle type which clearly shows the majority of other spirit bottles had limited evidence of reuse.

Case Gin

Just under two thirds of the case gin bottles displayed low wear (66%) and just under one third had moderate wear (26%) (Table 7.3). Again, most of the wear on these bottles occurred in domestic sites (Table 6.13 & Figure 67) suggesting they were domestically, rather than commercially, reused. Due to their square shape, they were not as strong as round bottles as typically, the thickness and quality of glass in round bottles is more consistent (Lindsey 2017). Therefore, they were not usually considered to be the most resilient for continuous reuse. The decent proportion (8%) of these bottles with extensive wear reveals that they were occasionally reused frequently, albeit mostly in a household setting (Table 7.3). This was likely due to their dark colour as this protected the contents from sunlight (Lindsey 2017). Although a small percentage of case gin bottles exhibited extensive use wear, the large proportion in the low wear category indicates that new bottles were regularly entering the use-reuse cycle.

Black 'Beer'

Black 'beer' bottles were represented with a surprisingly high percentage in the low wear category with almost two thirds (64%) displaying low wear and nearly a third (33%) with moderate wear. Moreover, they only had 3% showing extensive or high wear (Table 7.3) suggesting they were not reused as much as had been assumed. Most of the black 'beer' bottles with moderate to high wear came from the Lawson St bottle exchange, of which 65% produced a score above 2.0. In addition to this, the Worcester St domestic site yielded 38 bottles out of 68 with a score above 2.0 but very few had extensive wear (Table 6.11 & Figure 65).

Although they are called 'beer' bottles, this does not necessarily mean they only contained beer. The larger quart sizes in particular were commonly used for spirits such as whiskey and gin (Garland 2016; Lindsey 2017), which could explain the large quantity of these bottles found in the assemblages. The high number of these bottles (531) as well as the large proportion in the low wear category suggests that new black 'beer' bottles were regularly entering the use-reuse cycle and would not have been reused extensively.

Other Beer

The other beer category revealed a similar wear profile to the case gin and black beer categories. Again, just under two thirds displayed low wear (62%) and just under one third had moderate wear (31%). However, other beer bottles also had 7% with extensive/high wear (Table 7.3). It is worth noting that only 13 bottles were found in the other beer category and therefore some wariness should be taken into account when considering these results. It appears that the high levels of wear on this bottle type came from either the Lawson St bottle exchange site or the Worcester St domestic site as the five bottles with moderate wear were from these sites (Table 6.16 & Figure 70).

The other beer bottles were made of amber, green or clear glass and consisted of two main types: export or lager. Both were similar in shape but had some distinguishing characteristics. Export bottles had a convex neck and a two-part mineral finish with various forms of a blob finish, i.e. blob with skirt or tapered with

skirt (Smith 2004), whereas the lager bottles did not have mineral finishes and the neck was concave (Lindsay 2017). After the 1900s, it became difficult to distinguish between these beer bottles as they both commonly had crown finishes (Smith 2004; Lindsey 2017).

Ring-seal

Ring-seal bottles produced one of the highest levels of wear. These bottles are distinguished by a flat band of glass wrapped around the outside circumference of the upper neck just below the rim. Another name for a ring-seal finish is a champagne finish and these bottles are sometimes called champagne bottles (Lindsey 2017). Another characteristic of ring-seal bottles is a deep kick-up, often with a malmelon. This category produced just over half with low wear (55%) and over a third (38%) with moderate wear as well as 7% exhibiting high wear. Most of the wear came from bottles found at the Hereford St warehouse and the Lawson St bottle exchange. This suggests that not only did the Avon Bond (warehouse) import recycled ring-seal bottles from international manufacturers but also that ring-seal bottles were mainly reused commercially rather than domestically. This was likely due to the fact that they were the most robust bottles available in 19th century New Zealand and, as such, it is not surprising that they were extensively reused.

Other Wine

Much the same as ring-seal bottles, the other wine bottles also had deep-kick-ups with a mamelon or simply deep kick-ups. They also presented a similar wear profile with almost half displaying low wear (48%) and over a third with moderate wear (42%). These bottles showed a greater proportion with high wear (10%), however, as the bases were the only portions available for analysis, some circumspection is required. It could not be clearly determined if the other wine bottles were actually ring-seal bottles. According to Lindsey (2017), there are three other types of wine bottles: 'Bordeaux', 'Burgundy' and the 'Hock' or 'Rhine' shape. All typically have a malmelon kick-up but they do not always have a ring-seal finish. Without the ability to analyse the finish it cannot be assumed that they were, in fact, ring-seal. The Lawson Street bottle exchange yielded 30 out of the 31 other wine bottles that were analysed and therefore exhibited most of the wear (Table 6.15 & Figure 69).

Wine/Beer

The wine/beer bottles found in three of the assemblages were so fragmented that it was difficult to tell if they had the characteristics of a wine or beer bottle. This category provided the lowest proportion with low wear (39%) and the highest amount with moderate wear with 59%. Apart from the other spirits category, these bottles displayed the lowest percentage of high wear with only 2%. All three sites produced bottles with moderate wear scores. The Colombo St pub yielded the most with 17 bottles providing scores above 2.0 (Table 6.14 & Figure 68).

Summary

The other spirit category exhibited the least amount of wear with the highest proportion with low wear scores. Again, it is important to be careful due to the small number of these bottles. This cannot be said for case gin and black 'beer' bottles. The case gin category yielded a reasonable number of bottles but they had a high proportion of low use wear scores. Black 'beer' bottles were the largest category with 531 bottles in total, however, just under two thirds produced low wear scores and only 3% had high scores.

A degree of caution is also needed with the other beer and other wine categories due to the small quantities of these bottles. The other beer category had similar proportions to the black beer bottles (just under two thirds with low wear) but only 13 bottles were present in this category. While the other wine category with 31 bottles displayed more wear than the previous categories with over 40% displaying moderate wear scores and 10% with extensive wear.

Ring-seal and wine/beer bottles appear to have the most wear. Ring-seal is the second largest category and displayed high levels of wear with just over half with low wear, just under 40% with moderate wear and 7% with extensive wear. Although the beer/wine bottles exhibit higher levels with moderate wear, they also had very little extensive wear. Again, some level of caution needs to be considered due to the fragmentation of these bottles. In summary, the ring-seal bottles revealed

the most wear. This is to be expected because they were the most resilient and robust bottles that were available in 19th century New Zealand.

7.3: Glass Vessel Use-Reuse Cycle in Victorian Christchurch.

The study of use wear in this thesis proves that the glass vessel use-reuse cycle in Christchurch does vary depending on the setting as well as the bottle type. For example, household bottles that had little to no use wear suggest that they were disposed of after a single use-life and therefore exited the cycle after one use. On the other hand, the tableware vessels, especially in the Oxford Hotel site, were constantly circulating through (Table 6.4 & Figure 58).

Due to the lack of glass manufacturing in not only Christchurch, but throughout New Zealand until the 1920s, glass vessels used in New Zealand had to be imported from overseas. The vessels that were already filled by international manufacturers would be stored in warehouses, similar to the Avon Bond or Hereford St site, once they arrived. The use wear on the bottles (alcohol, pharmaceutical and condiment) from the Avon Bond assemblage indicates that most of the bottles were used infrequently and their use wear was mostly caused by travel and storage. Ring-seal bottles are the exception here. This category yielded 27 out of 82 bottles displaying moderate wear or higher suggesting that some ring-seal bottles were recycled before being filled overseas (Table 6.12 & Figure 66). Also, the large quantity of black 'beer' bottles and the high proportion of these with low use wear scores suggests that they were mainly imported and were regularly replaced in the use-reuse cycle, which does not allow for extensive reuse. (Table 6.11, 7.2 & Figure 65).

The bottle exchange that was studied in this thesis would have been significantly involved with the commercial use-reuse cycle in Christchurch. Once a bottle was bought by J. Snell, the dealer who owned the bottle exchange business on Lawson St (later known as the Canterbury Bottle exchange), it was sorted, washed and cleaned and then either returned to a manufacturer for refilling or sold. The study of use wear indicates that the majority of his business was alcohol bottles. The

Lawson St site produced the most wear on alcohol bottles overall (Table 6.2 & Figure 56) and across almost all the alcohol bottle types (Section 6.4). The bottles would then be sold to breweries, wineries, distilleries, pubs/hotels and sometimes households to be refilled.

In a pub setting such as the Oxford Hotel, the alcohol bottles and glass table-ware were used and reused on an ongoing basis. The glass table-ware was likely in use in a continuous use-reuse cycle until the vessels became broken or unusable. This is confirmed by the extent of use wear on the glass table-ware found at the Oxford Hotel (87% had a moderate to high use wear score). The alcohol bottles were also reused regularly but this process would have taken more time and been more labour intensive due to the washing/cleaning and refilling of the bottles. This would likely have occurred offsite as they did not have the proper equipment onsite (Cunliffe et al 2012) and is supported by the fact that they did not have the same high levels of wear in comparison to the glass table-ware. The alcohol bottles had 48% with scores of moderate levels or higher while glass table-ware had 87% (Tables 6.2, 6.4 & Figures 56, 58).

One of the household sites (Worcester Street) had similar wear levels to those from the Oxford Hotel (Figure 72 & Table 7.1). This indicates a drinking environment with most of the moderate to high levels of use wear found on alcohol bottles (Table 6.2 & Figure 56). It also implies that they circulated the use-reuse cycle multiple times. The sheer number of alcohol bottles suggests that this household generally disposed of its alcohol bottles after a single use (once the alcohol was consumed). However, the extent of wear suggests that they had already been recycled multiple times prior to them being purchased by the Worcester St household. This household reused a variety of other bottle types and due to the moderate levels of use wear on food-related bottles found at this site, it appears that they were regularly domestically reused for the preservation of fruit or vegetables. The low to moderate levels of use wear on condiment and personal bottles suggests a long but sporadic use-life for both bottle types indicating that they slowly went around the use-reuse cycle just one time.

Unlike the other sites, the other household site (Cotterill Street) was dominated by pharmaceutical bottles rather than alcohol bottles. Much more wear was apparent on the alcohol bottles than the pharmaceutical with alcohol bottles producing 12 out of 18 bottles with a score above 2.0 whereas only one out of 27 pharmaceutical bottles had this score (Tables 6.2, 6.3 & Figures 56, 57). As previously mentioned, this household also yielded the greatest number of vessels with high UWI scores (Figure 72). These high UWI scores mainly came from the alcohol category in addition to heavily used single items from the non-alcohol (non-alcoholic, food-related and condiment) and tableware categories. It appears the Cotterill St household kept many vessels in use over a long period of time implying that these bottles were domestically reused continuously (going around the use-reuse cycle multiple times within the household). This increases the likelihood that there was some form of polyfunctionality or repurposing - the reuse of bottles for different purposes than originally intended.

7.4: The Drinking Culture of Victorian Christchurch

With the foregoing analysis indicating that most of the bottles found in the five different sites are likely to have contained what would be expected from their form, it is possible to make some broader inferences about the ways in which the bottles were used. With alcohol bottles dominating in all but one assemblage there is strong evidence that drinking played an important part in Victorian society in Christchurch. Drinking alcohol was a mostly communal and collective aspect of popular culture. For people who drank together in homes and pubs, it was a bonding experience as they would have shared the same glass (Colombo Street pub/inn; Oxford Hotel; Cotterill & Worcester Streets domestic sites). Communal drinking and glass sharing reaffirmed established friendships and signaled new ones. Strangers did not share one glass – those who knew one another or who had resolved to become acquainted did so (Karskens 1999). The Oxford Hotel was known as a central hub to Christchurch's city life. It was located close to Market Square (Victoria Square as it is known today), which was a centre of activity for early Christchurch. This made the Oxford Hotel extremely popular with foreigners

requiring a place to stay as well as with the locals who frequented the pub. It also catered for the wider community as a venue to host meetings and events and was used as emergency rooms, as well as providing cheap alcohol to the residents of Christchurch (*Press* 15/4/1879).

A range of alcoholic drinks was consumed there, mainly spirits and beer as they both were contained in black 'beer' bottles. Squat and pint black beer would normally have contained beer while the tall or quart sizes were known to have contained spirits or sometimes beer (Harris 2009; Garland 2016; Lindsey 2017). Christchurch newspapers also advertised the sale of beer and spirits such as rum, brandy, Dunville's and Lorne Whiskey (*Lyttelton Times* 23/8/1862; *Star* 28/12/1876; 16/06/1877; Figures 74 & 75). The residents of Christchurch would sit around tables at the Oxford Hotel, bonding over drinks, (using tall tumblers, or drinking from the bottle, for beer and short tumblers for spirits) and playing games such as skittles (Watson 2013). In Christchurch, in 1878, there were forty-one hotels, including the Oxford Hotel, and they all made up an important part of the drinking culture of Victorian society as well as the society of early Christchurch as a whole.

In lower socio-economic households (Worcester Street), drinking would have been a similar experience as that in a hotel. Friends and families would share a bottle and a glass whereas in higher class households, sharing glasses was unheard of. There, they would usually have drinks around the dining table and dinner parties were regular occurrences (Karskens 1999; Woff 2014). The etched stem-ware from Cotterill Street were unusual artefacts and suggest that this was a household with higher socio-economic status and one in which entertaining guests and having dinner parties occurred. The presentation of alcohol was important enough in this household to warrant specific serving vessels and could suggest alcohol was only served on special occasions. The stem-ware also indicates that they drank wines and liquors, such as port or sherry, more regularly than those at Worcester Street (Woff 2014). The presence of the stem-ware and tumblers indicates the likelihood that some alcohol consumption occurred at the Cotterill Street site but this was

possibly in small quantities as a small number of assumed alcohol bottles was discovered there.

The prohibition movement could be the reason for the limited number of alcohol bottles found within the Cotterill Street household as its headquarters were also situated in Sydenham where the movement was more influential. There existed religious dissenters who thought the abuse of alcohol was ruining society by undermining moral behaviour, while other groups wanted to decrease the violence that alcohol had a tendency to create, especially towards women (Eldred-Grigg 1984). "Vomiting drunks were conspicuous everywhere and people knew, when a group was 'liquored up', things often end in violence" (Eldred-Grigg 1984 61). Domestic violence was quite common in the 19th century due to the legal right of husbands to have control over their wives' bodies and properties. For example, rape within marriage was legal. Acts of violence usually increased when alcohol was involved and women hoped the prohibition movement would have an impact on its decrease (Swarbrick 2011). The influence of temperance groups, such as the Women's Christian Temperance Union, could have been a significant factor in the Beattie family's tendency not to consume large amounts of alcohol (Rice 2008).

Although the temperance movement created awareness of a problem within New Zealand society, only a few legislations were passed. One of these sealed the business of commercial advantage of locally made spirits over imports, while also prohibiting illegal stills. It was called the Distillation Act of 1868 (Hutchins 2009) and it created more business for bottle exchanges including the Canterbury Bottle Exchange, situated on Lawson Street before it relocated to Colombo Street. The need for bottles increased and these bottles were required to be washed before being refilled and reused. This was due to the rising number of breweries, distilleries and wineries within the Canterbury region, including the Ward brewery and Waverley Wine Vaults (McLauchlan 1994; Rice 2008; Garland 2017). The Distillation Act was likely the reason that most of the unwanted stock at the Avon bond were alcohol bottles. The Avon bond was a warehouse that stored goods imported from outside New Zealand but they were obliged to pay a customs bond to the Provincial Council to be allowed to do this. The warehouse was also used by

merchants as a venue to auction their goods (Garland et al 2014) and if stock was not sold or allowed to be sold, it was disposed of.

In Christchurch, drinking alcohol was and still is a popular past-time, however, this drinking culture has changed over time. The types of alcohol that were preferred in the Victorian era varied in popularity from what is consumed today. Port, sherry, gin and whiskey were more common then while beer and wine are the more popular drinks these days. Drunkenness also decreased following the formation of the temperance movement but it has persisted on a lesser scale. Today, binge drinking is the new norm amongst the young and it appears that the drinking culture of today has reverted back to being similar to what it was in Victorian Christchurch.

Chapter 8: Conclusion

This thesis provides us with a way to better understand bottle reuse and how it can change interpretations of sites. It has shown that use wear on glass vessels can be measured with a use wear index and that this provides a way to examine variations in the extent of reuse, both between different functional categories of vessels, and between types of site.

Glass tableware vessels exhibited the most extensive use wear followed by the robust bottles commonly used for soda water, beer and other alcoholic beverages. Lowest levels of use wear were found on bottles for household products like ink, glue and shoe polish and on pharmaceutical bottles. Food-related and personal bottles such as perfumes also had mostly low levels of wear. With these 'non-beverage' classes of bottles occurring regularly in household settings it is, perhaps, surprising that the two household assemblages had the highest proportions of bottles showing extensive wear. However, these well-used vessels were all either glass tableware or bottles of types that would originally have held alcoholic beverages or soda water.

Beyond the household sector, bottles from the pub were more worn than those from an importers warehouse, suggesting that most, although not all use wear was acquired while bottles were in circulation in Christchurch and that hotels were a key focus for the rapid turnover of beverage bottles. Perhaps not surprisingly, the bottle exchange assemblage shared characteristics from each of the other site types, reflecting its central role in the local bottle reuse cycle.

The use wear index may also provide a way to address one of the perennial problems with bottle analysis; is it possible to assess the likelihood that a bottle was *repurposed* during the reuse process? Repurposing occurs when a bottle is refilled with contents other than what it would have originally contained. As shown in earlier chapters, there is abundant anecdotal evidence that many types of bottle have from time-to-time been repurposed in this way, although this seems to be most common with the robust black 'beer' and ring-seal bottles (Bedford 1986; Jones

1986; Petchey 2002). However, this does not mean that we should presume that every bottle assigned to the black 'beer' or ring seal type had been repurposed. Indeed, Harris' (2009) study of bottle labels from the Wanganui Hotel demonstrates that, at least in the hotel context, bottle function closely followed form. The present study suggests that the UWI scale may be a useful tool in determining the likelihood that any individual bottle was repurposed. Where a bottle exhibits more extensive use wear than is generally observed for that type of bottle, we can infer it has been reused frequently, and with each reuse the possibility that it had been repurposed increases.

Context is also relevant to the interpretation of reuse and repurposing. Bottles with extensive reuse were proportionally most abundant in the household assemblages examined in this study, suggesting that household contexts may be the most likely to yield bottles that had been repurposed. More than anything, however, this thesis has demonstrated that only a small proportion of the bottles from all study contexts exhibited extensive wear. Only 50 bottles/bases out of 1,148 (4.4%) had a UWI score above a 5.0. While it is impossible to equate this directly with repurposing, it does provide a strong indication that relatively few bottles had been reused in such a way.

The corollary of this observation is that the majority of bottles remained 'true to type' as they moved around the reuse cycle. It is clear that beverage bottles – for both alcoholic and non-alcoholic drinks – moved around this cycle more rapidly and more often than other kinds of bottles, reflecting the central role that drinking played in the social life of Christchurch. Drinking was a societal and bonding experience, especially in pub settings and in certain households (lower socio-economic status households), where sharing glasses was common. In upper class households, it remained a social experience albeit more civilised. Dinner parties were a regular occurrence and the presentation of alcohol was as important as the food. Drunkenness decreased following the formation of the temperance movement (1880s-1900s) but today it is slowly returning to a similar degree as that of Victorian Christchurch.

Evaluating the results of this thesis alongside other people's work has been difficult due to the scarcity of comparable studies. While many New Zealand archaeologists have discussed the possibility of reuse and repurposing, there have been no attempts to quantify the incidence of either, except in Harris' (2009) study of bottle labels. A similar situation exists in Australia, although there, Woff (2014) has developed a model of how the bottle reuse cycle operates. This study has confirmed general features of that model, and added new levels of detail, both through the study of a range of bottle-use contexts, but also by providing for the first time a direct measure of the extent of reuse a bottle has seen.

Although this thesis fills in certain gaps on bottle reuse in New Zealand, there is much more research to be carried out until bottle reuse and use wear on glass bottles are fully understood. Firstly, domestic reuse and recycling is part of the reuse cycle that needs to be studied in more detail due to the amount of wear found on the bottles in the household contexts. This could also include the modification of bottles in the home.

The continued use of the use wear scale will be beneficial for future archaeologists as it can determine the extent to which bottles were reused instead of assuming they were reused extensively. The identification of extensive reuse can act as a signpost for analysts that these bottles are more likely to have been repurposed. It is advised that, if this is the case, then it will be accurate to use more generic terminology, for example a black 'beer' bottle could be described as a dark olive green circular bottle. Another future suggestion would be a possible scale of use wear on the body of the bottle. It would be effective in discovering more about bottle reuse and their use wear from different activities such as being dragged along surfaces, having clamps attached during the washing and refilling processes, being bumped together during transport as well as being washed with wire brushes (Woff 2014).

When bottles are used in archaeology for consumption analyses and site interpretations bottle reuse does need to be taken into account so misinterpretation of the archaeological record does not occur (Woff 2014). The use wear scale will be

beneficial during analysis and therefore should be used as a tool to determine the extent of reuse which will then help to create a better understanding of the past.

References

AKERHAGAN, A. 2001. Clay Pipes from the man-of-war 'Kronan'. *Society for Clay Pipe Research Newsletter* 56, pp 29-35.

ADAMS, W.H. 2002. Recycling Bottles as Building Materials in the Pacific Islands. *Historical Archaeology* 36:2, pp. 50-57.

ADAMS, W.H. 2003. Dating Historical Sites: The Importance of Understanding Time Lag in the Acquisition, Curation, Use and Disposal of Artefacts. *Historical Archaeology 37:2*, pp. 38-64.

ANDERSEN, J. 1949. *Old Christchurch in Picture and Story.* Christchurch: Simpson & Williams.

ANDERSON, A. 1998. *The Welcome of Strangers.* Dunedin: Otago University Press, Dunedin City Council.

ARGUS. 1880. *Colonial Beer*. The Argus, 23 January 1880.

AUCKLAND STAR. [online] Available at: http://paperspast.natlib.govt.nz. (Accessed on 2017).

BARKER, D & MAJEWSKI, T. 2006. 'Ceramic Studies in Historical Archaeology'. in D. Hicks & M. Beaudry (eds.) *The Cambridge Companion to Historical Archaeology.* Cambridge: Cambridge University Press, pp. 205-231.

BAUGHER-PERLIN, S. 1982. 'Analysing Glass Bottles for Chronology, Function and Trade Networks', in R.S Dickens Jr (ed.) *Archaeology of Urban America: The Search for Pattern and Progress.* New York. Academic Press, pp. 259-290.

BEDFORD, S. 1986. *The History and Archaeology of the Halfway House Hotel Site, Cromwell Gorge*. Cromwell: New Zealand Historic Places Trust.

BOLLINGER, C. 1967. *Grog's Own Country: The Story of Liquor Licensing in New Zealand* (2nd ed.). Auckland: Minerva.

BOWEN, A.M. 2012. *Archaeology of the Chinese Fishing Industry in Colonial Victoria.* Sydney: Sydney University Press.

BRADLEY, C. 2000. 'Smoking Pipes for the Archaeologist', in K. Karklins. *Studies in Material Culture Research.* California, Pennsylvania: The Society of Historical Archaeology, pp. 104-133.

BRASSEY, R. 1991. Clay Tobacco Pipes from the Site of the Victoria Hotel, Auckland, New Zealand. *Australian Journal of Historical Archaeology 9*: pp. 27-30.

BROOKS, A. 2005. *An Archaeological Guide to British Ceramics in Australia 1788-1901*. Australia: The Australian Society for Historical Archaeology & La Trobe University.

BUTCHER, M & SMITH I. 2010. Talking Trash: Classifying Rubbish-bearing Deposits from Colonial New Zealand Sites. Journal of Pacific Archaeology 1:1, pp. 53-61.

BURNARD, T. 2000. 'An Artisanal Town-The Economic Sinews of Christchurch', in J.Cookson & G, Dunstall (eds.) *Southern Capital Christchurch: Towards a City Biography 1850-2000*. Christchurch: Canterbury University Press, pp. 115-137.

BUSCH, J. 1987. Second Time Around: A look at Bottle Reuse. *Historical Archaeology 21:1*, pp. 67-80.

CANTERBURY LAND DISTRICT DEEDS INDEXES. c1853. *Deeds Index C1- 616.* [online] Available at: https://www.archway.archives.govt.nz (Accessed on May 2017).

CAPLE, C. 2006. *Objects: Reluctant Witnesses to the Past*. New York: Routledge.

CARNEY, M. 1998. A Cordial Factory at Parramatta, New South Wales. *Australasian Historical Archaeology* 16: pp 80-93.
CARTER et al. 2013. *15 Lawson Street, Christchurch: Report on Archaeological Monitoring* (Underground Overground). Christchurch: Unpublished Report for Jamon Trust.
CESSFORD, C. 2001. The Archaeology of the Clay Pipe and the Study of Smoking. *Assemblage: The Sheffield Graduate Journal of Archaeology 6*, pp. 84-112.
CHALLIS, A. 1995. *Ka Pakihi Whakatekateka O Waitaha: The Archaeology of Canterbury in Maori Times.* Wellington: Department of Conservation.
CHASE, A.F et al. 2006. 'Archaeology and the Ethics of Collecting', in K.D Vitelli C. Colwell-Chanthaphonh (2nd ed.), *Archaeological Ethics.* Oxford, UK: Altamira Press, pp. 19-26.
CHRISTCHURCH CITY LIBRARIES. 2016. *Christchurch Street Names L.* [online]. Available at http://christchurchcitylibraries.com/Heritage/PlaceNames/ChristchurchStreetNames-L.pdf (Accessed on May 2017)
COCHRAN, M.D & BEAUDRY, M.C. 2006. 'Material Culture Studies and Historical Archaeology' in D. Hicks & M. Beaudry (eds.) *The Cambridge Companion to Historical Archaeology.* Cambridge: Cambridge University Press, pp. 191-204.
COLONIST. [online] Available at: http://paperspast.natlib.govt.nz. (Accessed on 2017).
CUNLIFFE, E. 2012*. 272 Worcester Street, Christchurch. Report on Archaeological Monitoring.* Unpublished Report: Opus Consultants.
CUNLIFFE, E et al. 2012. 794 *Colombo Street, Christchurch. Report on Archaeological Monitoring.* Christchurch: Unpublished Report: Nikau Contractors Ltd.
DAVIES, P. 2002. 'A Little World Apart... Domestic Consumption at a Victorian Forest Sawmill.' *Australasian Historical Archaeology* 20: pp. 58-66.
DAVIES, P. 2006. Mapping Commodities at Casselden Place, Melbourne. *International Journal of Historical Archaeology 10:4*, pp. 343-355.
DEANS, J. 1964. *Pioneers on the Port Cooper Plains: The Deans Family of Riccarton*. Christchurch. Simpson & Williams Ltd.
DEANS, J. 1971. *Letters to my Grandchildren*. Christchurch. Wyatt & Wilson
DEETZ, J. 1996. *In Small Things Forgotten: An Archaeology of Early American Life*. New York: Anchor Books.
DENSEM, J. 1990. *Christchurch Chronology: A History of Settlement.* (2nd ed.). Christchurch: Christchurch City Council.
DONALDSON, B et al. 1990. *Antique Bottle and Containers of Christchurch and District.* Christchurch: Christchurch Antique Bottles and Collectibles Club.
DONALDSON, M. 2012*. Beer Nation: The Art and Heart of Kiwi Beer.* Auckland: Penguin.
DUNGWORTH, D. 2012. Three and A Half Centuries of Bottle Manufacture. *Industrial Archaeology Review* 34:1, pp. 37-50.
ELDRED-GRIGG, S. 1982. *A New History of Canterbury*. Dunedin: J.McIndoe.
ELDRED-GRIGG, S. 1984*. Pleasures of the Flesh: Sex & Drugs in Colonial New Zealand 1840-1915.* Wellington: Reed.
ELLIS, A & WOFF, B. 2017. Bottle Merchants at A'Beckett Street, Melbourne (1875-1914). New Evidence for the Light Industrial Trade of Bottle Washing.

International Journal of Historical Archaeology (online). Springer US: pp. 1-21.

EVENING POST. [online] Available at: http://paperspast.natlib.govt.nz. (Accessed on 2017).

FAIRBURN, M. 1989. *The Ideal Society and Its Enemies: The Foundation of Modern New Zealand Society 1850-1900*. Auckland: Auckland University Press.

FAIRBURN, M. 2012. *Wakefield, Edward Gibbon. Dictionary of New Zealand Biography: Te Ara- The Encyclopaedia of New Zealand*. [online] Available at: http://www.teara.govt.nz. (Accessed on December 2017)

FULLAGAR, R. 2006. 'Residues and Use wear', in J. Balme & A. Paterson. *Archaeology in Practice: A Student Guide to Archaeological Analyses*. USA: Blackwell Publishing Ltd, pp. 207-226.

GAMBLE, C. 2015. *Archaeology: The Basics* (3rd ed.*)* New York: Routledge

GARLAND, J. 2013. *The Difficulties of Dating #1: Age is not Equal to Experience*. [online]. Available at http://blog.underoverarch.co.nz/ (Accessed on August 2017).

GARLAND, J et al. 2014. *The Terrace, M35/1050, Christchurch: Report on Archaeological Investigations.* Christchurch: Unpublished Report: Hereford Holdings.

GARLAND, J. 2016. *Whiskey, That Philosophic Wine, That Liquid Sunshine.* [online]. Available at http://blog.underoverarch.co.nz/ (Accessed on September 2017).

GARLAND, J. 2017. *The Waverley Wine Vaults.* [online]. Available at http://blog.underoverarch.co.nz/ (Accessed on September 2017).

GRANT, J., GORIN, S. & FLEMING, N. 2008. *The Archaeology Coursebook: An Introduction to Themes, Sites, Methods and Skills* (3rd ed.). Oxford: Taylor & Francis.

GRIFFITHS, D.M. 1978. Use-Marks on Historic Ceramics: A Preliminary Study. *Historical Archaeology 12*: pp 68-81.

GODDEN, G. 1991. *Encyclopaedia of British Pottery and Porcelain Marks.* New York: Crown Publishers.

GOJAK, D & STUART, I. 1999. The Potential for the Archaeological Study of Clay Tobacco Pipes from Australian sites. *Australasian Historical Archaeology* 17, pp 38-49.

GREW, F & DE NEERGAARDE, M. 1988. *Shoes and Patterns: Medieval Finds from Excavations in London*. London: Museum of London.

GROGAN, D.J. *The Analysis of Glassware from New Zealand Historic Sites.* MA Thesis. Dunedin: University of Otago.

GROSE, D.F. 1984. 'The Origins and the Early History of Glass', in D, Klein and W, Lloyd. *The History of Glass*. London. Orbis Publishing Co.

HABBERFIELD-SHORT, J. 2016. *Site Appraisal: 372-376 Worcester Street, Christchurch.* Christchurch: Unpublished Report: Modus Group Ltd.

HARGREAVES et al. 2000. *The Demon Drink: Alcohol and Prohibition.* Dunedin: Hocken Collections Bulletin No 3.

HARPER, B. 1980. *Petticoat Pioneers: South Island Women of the Colonial Era: Book Three.* Wellington: Reed.

HARRIS, J. 2009. 'Glass Artefacts', in M, Campbell, W, Gumbley & B. Hudson (eds). *Archaeological Investigations of the Bamber House and Wanganui Hotel Sites*

(Town Sections 79 and 77). UCOL Whanganui Converge Development, Wanganui. CFG Heritage, Auckland, pp 68-99.
HARRISON, R. 2000. Nowadays with Glass: Regional Variation in Aboriginal Bottle Glass Artefacts from Western Australia. *Archaeology in Oceania 35:1*, pp. 34-47.
HAYES, S. 2008. *Being Middle Class: An Archaeology of Gentility in Nineteenth Australia.* PhD Thesis. Bundoora: La Trobe University.
HEARD, K. 2000. 'Clay Tobacco Pipes', in P, Moore. Tilbury Fort: A Post-Medieval Fort and its Inhabitants. *Post-Medieval Archaeology 34:* 3-104, pp 59-63.
HICKS, D & BEAUDRY, M. 2006. 'Introduction: The Place of Historical Archaeology' in D. Hicks & M. Beaudry (eds.) *The Cambridge Companion to Historical Archaeology.* Cambridge: Cambridge University Press, pp. 1-13.
HILL, V.R. 2003. *The Port Philip Pastoral Frontier: A Study in Historical Archaeology*. PhD thesis. Bundoora: La Trobe University.
HODDER, I. 1991. *Reading the Past: Current Approaches to Interpretation in Archaeology*. Cambridge: Cambridge University Press.
HOPEFUL 1887. *Taken in: Being a Sketch of New Zealand life.* London: W.H Allen
HUTCHINS, G. 2009. *Your Shout: A Toast to Drink and Drinking in New Zealand*. Auckland: Hodder Moa.
HUTCHINSON, D. 1987. 'Identifying Bottles', in J. Birmingham & D Bairstow (eds.). *Papers in Australian Historical Archaeology.* Australia: The Australian Society for Historical Archaeology (Inc.).
JONES, O. 1986. *Cylindrical English Wine and Beer Bottles 1735-1850.* Ottawa: Environment Canada.
KARSKENS, G. 1999*. Inside the Rocks: The Archaeology of a Neighbourhood.* Sydney: Hale & Iremonger.
KING, J.A. 2006. 'Household Archaeology, Identities and Biographies'. in D. Hicks & M. Beaudry. *The Cambridge Companion to Historical Archaeology.* Cambridge: Cambridge University Press, pp. 293- 313.
LAWRENCE, S. 2000. Dolly's Creek: An Archaeology of a Victorian Goldfield's Community. Melbourne. Melbourne University Press.
LAWRENCE, S. 2006. 'Artifacts of the Modern World', in J. Balme & A. Paterson. *Archaeology in Practice: A Student Guide to Archaeological Analyses*. USA: Blackwell Publishing Ltd, pp. 362-385.
LAWRENCE, S & DAVIES, P. 2010. An Archaeology of Australia since 1788. Dordrecht: Springer.
LIGHT. J. 2000. 'A Field Guide to the Identification of Metal' in K. Karklins. *Studies in Material Culture Research.* California, Pennsylvania: The Society of Historical Archaeology, pp. 3-19.
LINDSEY, B. 2017. *Historic Glass Bottle Identification and Information Website.* [online]. Available at: https://www.sha.org/bottle. (Accessed on January-September 2017).
LINZ. c.1850. *Deeds Index-A- Christchurch Town Sections and Reserves*. Christchurch: Archives New Zealand
LINZ. c1853. *Deeds Index C1 1-750 Rural Sections Register*: Christchurch: Archives New Zealand.
LINZ. 1860. *Deed Index D-10. 247*. Christchurch: Archives New Zealand.
LINZ. 1871. *Deed Index. Vol 9 Folio 158.* Christchurch: Archives New Zealand.

LINZ. 1872. *Certificate of Title, BC2/96, Canterbury.* [online]. Available at: https://www.linz.govt.nz/land/landonline (Accessed on 2017).
LINZ. 1874. *Deed Index. Vol 9 Folio 158.* Christchurch: Archives New Zealand.
LINZ. 1877. *Certificate of Title, CB25/238, Canterbury.* [online]. Available at: https://www.linz.govt.nz/land/landonline (Accessed on 2017).
LINZ. 1879. *DP 75, Canterbury*. [online]. Available at: https://www.linz.govt.nz/land/landonline (Accessed on 2017).
LINZ. 1912. *Deed Index. Vol 9 Folio 158.* Christchurch: Archives New Zealand.
LINZ. 1937 *Deed Index. A1 Folio 1103.* Christchurch: Archives New Zealand.
LINZ 1984. *Deed Index. A1 Folio 1103.* Christchurch: Archives New Zealand.
LUCAS, L. 2002. *Glass Bottle Recycling in Victoria*. BA Honours Thesis. Bundoora: La Trobe University.
LYNOTT, M. 2003. 'The Development of Ethics in Archaeology', in L.J Zimmerman, K.D Vitelli & Z Hollowell-Zimmer (eds.), *Ethical Issues in Archaeology.* Walnut Creek, USA: Altamira Press, pp. 17-27.
LYTTELTON TIMES. [online] Available at: http://paperspast.natlib.govt.nz. (Accessed on 2017).
MACREADY, S & GOODWYN, J. 1990. 'Volume 2: The Artefacts and Faunal Material', *in Science and Research Internal Report 92: Slums and Self Improvement: The History and Archaeology of the Mechanics Institute, Auckland and its Chancery Street Neighbourhood (unpublished).* New Zealand: Department of Conservation.
McALOON, J. 2000. 'Radical Christchurch', in J.Cookson & G, Dunstall (eds.) *Southern Capital Christchurch: Towards a City Biography 1850-2000*. Christchurch: Canterbury University Press, pp. 162-192.
McALOON, J. 2001. 'Starting Late,'in G.Cant & R, KirkPartrick (eds.) *Rural Canterbury: Celebrating its History.* Wellington; Daphne Brasell Associates and Lincoln University Press, pp. 21-40.
McLAUCHLAN, G. 1994. *The Story of Beer: Beer and Brewing- A New Zealand History*. Auckland: Viking Penguin.
MEHLMAN, F. 1982. *Phaidon Guide to Glass.* Oxford: Equinox Ltd.
MILLER, G & SULLIVAN, C. 1984. Machine-Made Glass Containers and the End of Production for Mouth-Blown Bottles. *Historical Archaeology 18:* pp. 83-96.
MORRIS, M. 2010. *Unpaid Domestic Work- Making Clothes and preserving food*. *Te Ara- The Encyclopaedia of New Zealand*. [online] Available at: https://teara.govt.nz. (Accessed on September 2017).
NEEGAARD, M. 1987. 'The Use of Knives, Shears, Scissors and Scabbards', in J.Cowgill, M. De Neergaard & N. Griffiths (eds.) *Knives and Scabbards: Medieval Finds from Excavations in London*. London: Museum of London.
NEW ZEALAND FEDERATION OF UNIVERSITY WOMEN. 1977. *Sydenham: The Model Borough of Old Christchurch: An Informal History.* Christchurch: New Zealand Federation of University Women.
NORRIS, P & BERESFORD, R. 2011. *Medicines and Remedies: Plants, Pills and poultices before 1900: Te Ara- The Encyclopaedia of New Zealand*. [online] Available at: https://teara.govt.nz.
OGILVIE, G. 1996. *Pioneers of the Plains: The Deans of Canterbury*. Christchurch. Shoal Bay Ltd.
OGILVIE, G. 2007. *Banks Peninsula: Cradle of Canterbury* (3rd ed). Christchurch: Phillips & King Publishers.

ORSER JR, C.E. 1989. On Plantations and Patterns. *Historical Archaeology* 23: 2, pp. 28-40.
ORSER JR, C.E. 2004. *Historical Archaeology* (2nd ed.). New Jersey: Pearson Education, Inc.
OWENS, A et al. 2010. Fragments of the Modern City: Material Culture and the Rhythms of Everyday Life in Victorian London. *Journal of Victorian Culture* 15:2, pp 212-225.
PETCHEY, P. 2002. *Alexandra Flood Protection Scheme, Archaeological Investigations*, *Central Business District.* Alexandra: Unpublished Report: MWH.
PETCHEY, P & INNANCAHI, J. 2012. Bottle Top Capsules in New Zealand Historic Archaeological Sites*. Journal of Pacific Archaeology* 3: 2, pp. 1-16.
PETERS, S.J. 1996. Archaeological Wines: Analysis and Interpretation of a Collection of Wines Recovered from the *William Salthouse* Shipwreck (1841). *Australasian Historical Archaeology 14*: pp 63-68.
PICKLES, K. 2000. 'Workers and Workplaces', in J.Cookson & G, Dunstall (eds.) *Southern Capital Christchurch: Towards a City Biography 1850-2000*. Christchurch: Canterbury University Press, pp. 138-161.
PIPER, A. 1988. Chinese and Cultural Conservation in Nineteenth-Century Southern New Zealand. *Australian Journal of Historical Archaeology 6*: pp. 34-64.
PLATTS, M. 2016. *16 Cotterill Street, Christchurch*. Unpublished Artefact Analysis. Christchurch. Strata Heritage.
POLAK, A. 1975. *Glass, its Makers and its Public*. London. Weideneld and Nicolson.
POTTERIES, THE. 2008. *A-Z of Stoke-on-Trent Potters.* [online] Available at http://www.thepotteries.org.
PRESS. [online] Available at: http://paperspast.natlib.govt.nz. (Accessed on 2017).
RENFREW, C & BAHN, P. 2008. *Archaeology: Theories, Methods & Practice.* (5th ed.) London: Thames & Hudson.
RICE, G. 2008. *Christchurch Changing: An Illustrated History* (2nd ed). Christchurch: Canterbury University Press
ROGERS, A. 2007. *Illustrated History of Canterbury.* Auckland: Reed.
RYAN, G. 2004. *The Making of New Zealand Cricket, 1832-1914.* London: Frank Cass.
RYAN, G (ed.). 2005. *Tackling Rugby Myths: Rugby and New Zealand society* 1854-2004. Dunedin: Otago University Press.
SÁEZ, C.G & LERMA I.M. 2015. 'Traceology on Metal. Use wear Marks on Copper-Based Tools and Weapons', in J.M Marreiros et al (eds.) *Use wear and Residue Analyses in Archaeology.* Switzerland: Springer International Publishing, pp. 171-188.
SAMFORD, P.M. 1997. Response to a Market: Dating English Underglaze Transfer-printed Wares. *Historical Archaeology* 31:2, pp. 1-30.
SCOTTER, W.H. 1965. *A History of Canterbury Vol III 1876-1950.* Christchurch: Whitcombe & Tombs.
SIMPSON, T. 1997. *The Immigrants: The Great Migration from Britain to New Zealand, 1830-1890.* Auckland: Godwit Publishing Ltd.
SMITH, I. 2004. *Bottle Glass Identification Guide: A Brief Introduction to the Description of Bottle Glass from New Zealand Archaeological Sites.* Dunedin: Otago Archaeological Laboratory Guidelines. Department of Anthropology and Archaeology, University of Otago.

SKIBO, J & SCHIFFER, M.B. 2008. *People and Things: A Behaviour Approach to Material Culture.* New York: Springer.
SOUTH, S. 1977. *Method and Theory in Historical Archaeology*. New York: Academic Press.
SPRAGUE, R. 1981. A Functional Classification for Artifacts from 19th and 20th Century Historical Sites. *North American Archaeologist*, 2: pp. 251-261.
STATISTICS NEW ZEALAND. 1874. *1874 Census for New Zealand.* [online] Available at https://www3.stats.govt.nz (Accessed on September 2017)
STAR. [online] Available at: http://paperspast.natlib.govt.nz (Accessed on 2017).
STEINBERG, D.A. 2008. *Shipwreck Salvage in the Northern Territory: The Wreck of the Brisbane as a Case Study in the Site Salvage and Material Culture Reuse*. Fremantle: Australian National Centre of Excellence for Maritime Archaeology.
STELL-NEWMAN, T. 1970. A Dating Key for Post-Eighteenth Century Bottles. *Historical Archaeology* pp. 70-75.
STUART, I. 1993. Bottles for Jam?: An Example of Recycling from a Post-Contact Archaeological Site. *Australian Archaeology 36*: pp. 17-21.
SUDBURY, B. 1978. Additional Notes on Alternative Uses for Clay Tobacco Pipes and Tobacco pipe fragments. *Historical Archaeology 12*: pp. 105-107.
SWARBRICK, N. 2011. *Domestic Violence. Te Ara- The Encyclopaedia of New Zealand*. [online] Available at: https://teara.govt.nz. (Accessed on September 2017).
TASKER, J. 1989. *Old New Zealand Bottles and Bygones.* Wellington: Heinemann Reed.
ULM et al. 2009. Historical continuities in Aboriginal Land-use at Bustard Bay, Queensland: Results of Use wear and residue analysis of Aboriginal Glass Artefacts. *Australasian Historical Archaeology 27*: pp. 111-119.
WALKER, I.C. 1976. Alternative Uses of Clay Tobacco Pipe Fragments: Some Notes. *Historical Archaeology 10*: pp. 124-127.
WATSON, K. 2000. *A Land of Plenty?* Unpublished MA thesis. Dunedin: University of Otago.
WATSON, K. 2013. '*It isn't all beer and skittles*' [online]. Available at http://blog.underoverarch.co.nz/ (Accessed on September 2017).
WILSON, J. 2012. *Historic Canterbury*, Auckland: David Bateman Ltd.
WOFF, B. 2014. *Bottle Reuse and Archaeology: Evidenced from the Site of a Bottle Merchants Business.* BA Honours Thesis. Bundoora: La Trobe University.
WOODS, N. 2017. *Household Narratives from a Colonial Frontier*. PhD Thesis. Dunedin. University of Otago.
WYNN, G & CANT, G. 2001. 'The Bonanza Wheat Boom', in G.Cant & R, KirkPartrick (eds.) *Rural Canterbury: Celebrating its History.* Wellington; Daphne Brasell Associates and Lincoln University Press, pp. 61- 79.
YAMIN, R. 1998. 'Lurid Tales and Homely Stories of New York's Notorious Five Points'. Historical Archaeology 32:1, pp. 74-85.

N.B. LINZ: Land Information New Zealand.